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Sovereignty, Jurisdiction, and Property in Outer Space: Space Resources, the Outer Space Treaty, and National Legislation

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Sovereignty, Jurisdiction, and Property in Outer Space: Space Resources, the Outer Space Treaty, and National Legislation

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Abstract

Space resources and space property rights have long been popular topics. This interest has increased recently. The development of an embryotic space resources industry, and national legislation intended to foster it, has turned what had previously been a somewhat academic discussion about the true scope of the ‘freedom’ to use outer space and the limitations of the ‘non-appropriation principle’ into one of significance not just for outer space but the international order more broadly. There is an ambiguity at the heart of the Outer Space Treaty, it places the ‘freedom of use’ of outer space in the first article, its preamble talks of opening outer space for the human future, yet the non-appropriation principle potentially prevents all of that. In order for there to be a human future in outer space humanity needs to be able to make use of the resources in outer space, but if they cannot be ‘appropriated’ then that cannot happen. This thesis seeks to understand that contradiction and identify solutions.

It examines the Outer Space Treaty as the foundational and fundamental core of the space governance regime but also seeks to place it and the concept of property rights in a wider context. Utilizing, treaties, laws, negotiating records, and secondary sources from a range of disciplines, this thesis will examine the seeming contradiction between being free to use something but not to appropriate it. It will find that it is possible to construct a property rights regime for space resources within the framework of the Outer Space Treaty. However, in order for that regime to be practically useful, it will require international cooperation and coordination. It will require positive action to achieve. The alternative is anarchy, the likes of which Article II of the Outer Space Treaty was intended to avoid.

List of Contents

Abstract

List of Contents

List of Treaties, Legislation, Cases and UN Documents

Acknowledgements

Authors Declaration

Chapter One: Introduction

- 1.1 Purpose of the Study
- 1.2 Background
- 1.3 Research Question and Hypothesis
 - 1.3.1 First Research Question
 - 1.3.2 Second Research Question
 - 1.3.3 Third Research Question
- 1.4 Research Methodology
- 1.5 Intended Outcomes
- 1.6 Overarching Summary

Chapter Two: Space Resource Activities

- 2.1 Introduction
- 2.2 A 'Gold Rush' in Space?
- 2.3 Considerations of Economic Viability and Equity
- 2.4 A Space Wilderness Reserve
- 2.5 Conclusion

Chapter Three: Public International Law

- 3.1 Introduction
- 3.2 Special Regimes
- 3.3 Gaps and Silence
- 3.4 VCLT and Treaty Interpretation
- 3.5 Customary International Law
 - 3.5.1 State Practice
 - 3.5.2 *Opinio juris*
 - 3.5.3 General Assembly Resolutions
 - 3.5.4 Treaties
 - 3.5.5 'Specifically Affected States' and Time
 - 3.5.6 'Modern Custom'
 - 3.5.7 'Instant' Custom
 - 3.5.8 'Grotian moment'
- 3.6 Soft Law
- 3.7 Space resources and customary international law
- 3.8 Conclusion

Chapter Four: Space Law Treaties

- 4.1 Introduction
- 4.2 The Outer Space Treaty
 - 4.2.1 The Preamble
 - 4.2.2 Article I
 - 4.2.3 Article II
 - 4.2.3 Article III
 - 4.2.4 Article VI
 - 4.2.5 Article VIII

4.3	The Moon Agreement
4.4	UNCLOS
4.4.1	Seabed Mining and the 'Area'
4.5	Conclusion
Chapter Five: What is a Celestial Body?	
5.1	Introduction
5.2	Defining a Celestial Body
5.3	Treaty Term
5.3.1	The Ordinary Meaning of 'Celestial Body'
5.4	Scientific Definitions
5.4.1	Planets
5.4.2	Moons
5.4.3	Small Solar System Bodies: Asteroids and Comets
5.5	Legal Definitions
5.5.1	Pop's Four Approaches
5.5.2	Size
5.5.3	Moveable v Immovable
5.6	A definition of celestial body
5.7	Conclusion
Chapter Six: History of Property	
6.1	Introduction
6.2	Rome
6.3	Medieval Law
6.4	English Common Law
6.5	Property Revolution
6.6	Colonial Developments
6.7	Conclusion
Chapter Seven: Property Theory	
7.1	Introduction
7.2	Property as a 'thing'
7.3	John Locke and Property as a Natural Right
7.4	Positive Property or Bundle of Rights
7.4.1	Right to Exclude
7.4.2	Right to Use
7.4.3	Are All Sticks Equal?
7.5	Property and the State
7.6	Enforcement, the Rule of Law and the Value of Property Rights
7.7	Alternatives
7.7.1	Proudhon
7.7.2	Elinor Ostrom: Institutions for Governing the Commons
7.7.3	Stewardship
7.8	Conclusion
Chapter Eight: Sovereignty and Jurisdiction	
8.1	Introduction
8.2	Modern Sovereignty
8.3	Territory
8.4	Post-Modern Sovereignty?
8.5	Origins of Sovereignty
8.6	The Ocean
8.7	Jurisdiction in International Law

8.8	The Guano Islands Act
8.9	Conclusion
Chapter Nine: Space Resource Activities and Space Law	
9.1	Introduction
9.2	Relationship between International and National Law
9.3	US Law and Policy
9.3.1	ASTEROIDS ACT
9.3.2	Title IV CSLCA
9.3.3	American Space Commerce Free Enterprise Act
9.3.4	Space Force and President Trump's Space Policy
9.3.5	International Law and the US Legal System
9.4	Luxembourg
9.4.1	Law on the Exploration and Use of Space Resources
9.4.2	International Law in Luxembourg
9.5	UNCOPUOS
9.6	The Hague International Space Resources Governance Working
Group	
9.7	Conclusion
Chapter Ten: Conclusion	
10.1	Overview
10.2	Research Questions
10.2.1	First Research Question
10.2.2	Second Research Question
10.2.3	Third Research Question
10.3	Solution
10.4	Further Work
10.5	Concluding Remarks
List of References	

Lies of Treaties, Legislation, Cases and UN Documents

International

Treaties

- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 18 December 1979, entered into force 11 July 1984) 1363 UNTS 3
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Finally, of course, I also could not have done it without my parents, to say they have been supportive over these last few years is an understatement, thanks Mum and Dad, it really is appreciated.

Authors Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work full acknowledges opinions, ideas, and contributions from the work of others.

It was not necessary to seek ethical clearance for any of the research presented in this thesis.

I declare that the Word Count of this Thesis is 89,183 words

Name:

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Chapter One: Introduction

1.1 Purpose of the Study:

The purpose of this study is to critically evaluate the governance framework of outer space in order to establish whether mining (space resource activities) in outer space is permitted and, if it is, what will the legal regime look like. The reason behind the ambiguity regarding the mining of space resources (water and other minerals) in outer space lays within the foundational treaty of space law; the Outer Space Treaty [Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies¹], which, in Article II, prohibits “national appropriation by claim of sovereignty, by means of use, or occupation, or by any other means.” The question is, therefore, to what extent is mining an act of appropriation. The non-appropriation principle, laid out in Article II of the Outer Space Treaty, is one of the core fundamental principles of space governance. Yet space resources are the key to unlocking a human future in outer space. If they are ‘inaccessible’ by virtue of the Outer Space Treaty then either humanity’s future in space is going to be limited, or more likely, the Outer Space Treaty will be discarded. Neither of these outcomes are desirable.

Furthermore, States are taking action. During the course of this study, two countries have produced national legislation on space resources and there have been many hours of discussion (sometimes heated) at the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), the primary international forum on space governance. As a result, fragmentation is a growing concern. Three blocks of States are presently

¹Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205 (Outer Space Treaty/OST)

emerging: those led by the United States and Luxembourg who are content with individual States developing national legislation on space resources; those led by Russia who object to the ‘unilateral’ nature of such national legislation; and the Moon Agreement [Agreement Governing the Activities of States on the Moon and Other Celestial Bodies]² States who view the solution as lying within Article 11 of the Moon Agreement. The Outer Space Treaty and the space governance regime emanating from it is not perfect, and certainly has its issues, however it has facilitated peaceful cooperation in outer space and virtually exponential growth of activity in outer space for over 50 years, this is threatened by fragmentation of the regime. Despite its flaws that regime is preferable to a fragmented governance structure, and certainly preferable to none at all. Therefore, these questions need answering and solutions need illuminating. That is the intention of this study.

Having considered the background of the study it is important to look forward and consider both the impact that such a discussion can have and those stakeholders which may be potential beneficiaries of this work. The biggest potential impact is to underscore the practical need for an international framework on space resources. The international community is currently in the process of debating this through UNCOPUOS and this study could influence minds, particularly as The Hague International Space Resources Governance Working Group (The Hague Working Group) has proposed just such a framework. Indeed, as this author has been a member of that Working Group the work undertaken in service of this study has already had an impact on the debate. The Hague Working Group is an independent international forum comprised of academics, governments, and other stakeholders. They have

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

produced a set of building blocks for the development of an international framework on space resource activities.³ The Hague Working Group's Building Blocks have been presented to UNCOPUOS, where they have generally, but not universally, been positively received.

An additional potential impact of this study is regarding the question of defining 'celestial bodies.' There have been, and are, proposals to create 'categories' of celestial bodies and potentially even exclude certain size bodies from the 'non-appropriation principle' altogether, this work takes an in-depth look at the definition of celestial bodies as used in the Outer Space Treaty, and should warn against such notions. The Outer Space Treaty does not contain a definition of this term, which has not received as much attention as the definition of 'outer space.' Indeed, beyond this work, only Fasan⁴ and Pop⁵ have examined the term in any great detail.

As for potential stakeholders, 'industry' is a key stakeholder however, owing to difficulties due to funding, or more accurately lack thereof, the pool has shrunk considerably. That said, there are still companies exploring space resources and likely to be future entrants to the industry, particularly as the on-orbit servicing industry matures and plans for returns to the Moon and beyond take shape creating a market for space resources. Furthermore, governments are still considering space resources, not just the United States and Luxembourg, others are considering new national legislation on space resources, including the United Kingdom.⁶ Additionally, many

³The Hague International Space Resources Governance Working Group' (International Institute of Air and Space Law) <<https://www.universiteitleiden.nl/en/law/institute-of-public-law/institute-of-air-space-law/the-hague-space-resources-governance-working-group>> accessed 9 January 2020

⁴Ernst Fasan, 'Asteroids and other Celestial Bodies – Some Legal Differences' (1998) 26 J. Space L. 33

⁵Virgiliu Pop, 'A Celestial Body is a Celestial Body is a Celestial Body...' 52nd IAF Congress (2001) <http://www.spacefuture.com/pr/archive/a_celestial_body_is_a_celestial_body_is_a_celestial_body.shtml> accessed 10 June 2015; Virgiliu Pop, *Who Owns the Moon? Extraterrestrial Aspects of Land and Mineral Resources Ownership* (Springer 2009)

⁶Based on personal communications with relevant government employees

states are active in the ongoing discussions regarding space resources at the Legal Subcommittee of UNCOPUOS, they will find this work useful.

This is not the first work on space property rights or space resources. The leading preceding work is Virgiliu Pop's *Who Owns the Moon?*⁷ but works by Thomas Gangale⁸, Fabio Tronchetti⁹ and Ricky J. Lee¹⁰ have also been produced. The International Academy of Astronautics have also produced a study on space mineral resources¹¹ which included an assessment of legal issues and Ram Jakhu, Joseph Pelton and Yaw Ot Mankata Nyampong produced *Space Mining and Its Regulation* in 2017.¹² Pop and Gangale had the objective of refuting claims of people like Dennis Hope that they had ownership of land on the Moon or 'owned' asteroids. Pop, Gangale, Tronchetti, and Lee all produced their monographs before the US space resources law, and neither the IAA [International Academy of Astronautics] study nor *Space Mining and Its Regulation* have their focus on the question of property rights but rather address it as part of a larger work on issues relating to space resources. None take into account the developments as a result of the ongoing discussions by States at the UN on the topic of space resources. Nor do any of them take the detailed examination of the nature of property that is undertaken in this study. While Pop does address the question of the definition of a 'celestial body' as is argued in this work his conclusions are flawed. This work builds on those works, particularly of Pop, Gangale, Tronchetti and

⁷Pop, *Who Owns the Moon?* (n 5)

⁸Thomas Gangale, *The Development of Outer Space: Sovereignty and Property Rights in International Space Law* (Praeger 2009)

⁹Fabio Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime* (Martinus Nijhoff, 2009)

¹⁰Ricky J. Lee, *Law and Regulation of Commercial Mining of Minerals in Outer Space* (Springer 2012)

¹¹Arthur M. Dula and Zhang Zheniun (eds) *Space Mineral Resources: A Global Assessment of the Challenges and Opportunities* (International Academy of Astronautics 2015)

¹²Ram S Jakhu, Joseph N. Pelton, Yaw Ot Mankata Nyampong, *Space Mining and its Regulation* (Springer 2017)

Lee, and seeks to answer the questions that they necessarily left unanswered and deal with the developments that have occurred since 2015.

1.2 Background:

Article II of the Outer Space Treaty of 1967 prohibits “national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”¹³ This is viewed as a fundamental,¹⁴ cardinal principle¹⁵ of space law, and has been described as a cornerstone of the space law regime.¹⁶ It is one of the most universally recognized principles of space law¹⁷ and it is generally regarded as having achieved the status of a customary norm of international law¹⁸. A few scholars have even gone so far as to argue that the non-appropriation principle, expressed in Article II, has achieved the status of a *jus cogens* norm. Though they do not make a case for this they merely assert it,¹⁹ which is fairly common for claims about *jus cogens*.²⁰ While, the non-appropriation principle is clearly a fundamental principle of space governance it is a stretch to place it on such a pedestal.

That Article II of the Outer Space Treaty prohibits the appropriation of the Moon or any celestial body, in whole or in part is clear, unambiguous and universally accepted.

¹³Outer Space Treaty (n 1), Article II

¹⁴Pop, ‘A Celestial Body is a Celestial Body is a Celestial Body...’ (n 5); Ricky J. Lee, ‘Article II of the Outer Space Treaty: Prohibition of State Sovereignty, Private Property Rights or Both?’ (2004) 11 Aust. Int’l L. J. 128, 128; Steven Freeland and Ram Jakhu, ‘Article II’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogel (eds), *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag 2009), 45, 48, 63

¹⁵I.H.Ph. Diederiks-Verschoor and V. Kopal, *An Introduction to Space Law* (3rd edn, Kluwer Law International 2008), 26

¹⁶Fabio Tronchetti, ‘Legal Aspects of Space Resource Utilization’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar 2015), 778

¹⁷Lee, ‘Article II of the Outer Space Treaty’ (n 14), 128; Lee, *Law and Regulation of Commercial Mining* (n 10), 166

¹⁸Paul B. Larsen, ‘Asteroid Legal Regime: Time for a Change?’ (2014) 39 J. Space L. 275, 289; Freeland and Jakhu ‘Article II’ (n 14), 55, 63; Francis Lyall and Paul B. Larsen *Space Law: A Treatise* (Ashgate 2009), 180; Lee, ‘Article II of the Outer Space Treaty’ (n 14), 134-135

¹⁹Steven Freeland and Ram Jakhu ‘Article II’ (n 14), 55, 63 Lee, *Law and Regulation of Commercial Mining* (n 10), 125-126

²⁰Matthew Saul, ‘Identifying *Jus Cogens* Norms: The Interaction of Scholars and International Judges’ (2015) 5 Asian Journal of International Law 26, 41

However, the status of resources is less clear. Only the Moon Agreement discusses resources specifically.²¹ The Moon Agreement declares that “the Moon and its natural resources are the common heritage of mankind”²² and that States “undertake to establish an international regime...to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible.”²³ The Moon Agreement is generally regarded as being a failed treaty. While it received enough support to enter into force, fewer than two dozen States signed up to it and none of the ‘major players’ in space are parties to the treaty.²⁴ The Common Heritage of Mankind (CHM) principle in Article 11 of the Moon Agreement was the main reason for its widespread rejection as it was interpreted as being a requirement to share revenue and technology.²⁵

State Practice can help with the interpretation of treaty provisions as it demonstrates what States feels they are legally permitted or prohibited from doing something.²⁶ In space law, state practice is frequently limited, however this has not hampered the development of customary norms, as was in evidence in the rapid crystallization of customary international law in the wake of Sputnik.²⁷ Practice supports the notion that states can appropriate extracted samples and/or resources, at least provided the purpose behind such activity is for scientific purposes. Both the United States and the Soviet Union conducted lunar sample return missions that elicited no objections from

²¹Moon Agreement (n 2)

²²*ibid*, Art 11(1)

²³*ibid*, Art 11(5)

²⁴UNCOPUOS ‘Status of International Agreements Relating to Activities in Outer Space as at 1 January 2019’ (1 April 2019) UN Doc A/AC.105/C.2/2019/CRP.3

²⁵Frans von der Dunk, ‘*Contradictio in terminis* or Realpolitik? A Qualified Plea for a Role of ‘Soft Law’ in the Context of Space Activities’ in Irmgard Marboe (eds), *Soft Law in Outer Space: The Function of Non-binding Norms in International Space Law* (Boehlau Verlag 2012), 40

²⁶Richard Gardiner, *Treaty Interpretation* (2nd edn OUP 2017), 254-255

²⁷Maxwell Cohen ‘Introduction: Law and Politics in Space’ in Maxwell Cohen, (eds) *Law and Politics in Space: Specific and Urgent Problems in the Law of Outer Space* (Leicester University Press 1964), 11-20, 18

the international community. Additionally, neither the comet and asteroid sample return missions of *Stardust* nor *Hayabusa* provoked objection.²⁸ The United States Government has maintained that the Apollo Moon rocks belong to the US Government²⁹ or the governments they were gifted to.³⁰ The Russian Federation, has gone a step further, and sold a portion of the *Luna 20* sample at auction in 1993, again without eliciting objection from the international community.³¹ Some have suggested that this establishes at least a customary precedent for the sale of extracted samples or resources³², although how much of a role the initial scientific purpose of the extraction plays is unclear.

Article VI of the Outer Space Treaty makes States responsible for the actions of their nationals in space. Therefore the actions of a private corporation like Deep Space Industries or Planetary Resources could give rise to a violation of Article II of the Outer Space Treaty.³³ Private individuals and corporations are under the same prohibition on owning ‘outer space, the moon and other celestial bodies’ as states. Jenks has said that “states bear international responsibility for national activities in space; it follows that what is forbidden to a state is not permitted to a chartered company created by a state or to one of its nationals acting as a private adventurer.”³⁴ Fabio Tronchetti has written that “the prohibition to extend state sovereignty in the

²⁸Pop, *Who Owns the Moon?* (n 5), 135-136

²⁹Matthew J. Kleiman *The Little Book of Space Law* (American Bar Association 2012), 156

³⁰*US v One Lucite Ball Containing Lunar Material* 252 F.Supp.2d 1367 (S.D.Fla 2003); Virgiliu Pop, *Who Owns the Moon?* (n 5), 140-141

³¹Pop, *Who Owns the Moon?* (n 5), 140-141; Brian Harvey, *Soviet and Russian Lunar Exploration* (Springer-Praxis 2007), 246

³²Pop, *Who Owns the Moon?* (n 5), 141

³³Diederiks-Verschoor and Kopal, *An Introduction to Space Law* (n 15), 28-29; Lyall and Larsen, *Space Law* (n 18), 66, 470, 566; Pop, *Who Owns the Moon?* (n 5), 64

³⁴C. Wilfred Jenks, *Space Law* (Stevens and Sons 1965), 201

space environment generates an implicit and automatic ban to acquire titles of property, both public and private in outer space.”³⁵

The main line of reasoning supporting this position is that private property needs a state in order to exist, therefore any private property in ‘outer space, the moon and other celestial bodies’ would be national appropriation and therefore in violation of Article II of the Outer Space Treaty. Kevin Gray has argued that the state is critical to the very existence of ‘property.’³⁶ Pop has argued that private appropriation cannot exist independently from state appropriation and that property rights need a state to enforce them in order for them to exist.³⁷ This is also supported by Francis Lyall and Paul B. Larsen who have written that “only states can have sovereignty and thereby invest others with property rights.”³⁸ Pop has pointed out that while *de facto* appropriation and possession can occur without the legal infrastructure of a state, property rights themselves do not exist without that infrastructure.³⁹

However, there are those who argue that property rights do not need sovereignty to exist and that instead of property rights emanating from government, governments simply provide recognition of property rights which does not constitute appropriation as defined by Article II of the Outer Space Treaty⁴⁰ Regarding this debate Margaret Davies has written that “in the present context resources in outer space may... at some stage constitute a new frontier for the expansion of tangible property rights.”⁴¹

³⁵Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies* (n 9), 199

³⁶Kevin Gray, ‘Property in Thin Air’ (1991) 50 Cambridge L.J. 252, 299, 304

³⁷Pop, *Who Owns the Moon?*, 62-66

³⁸Lyall and Larsen, *Space Law* (n 18), 184

³⁹Pop, *Who Owns the Moon?* (n 5), 66

⁴⁰Alan Wasser and Douglas Jobes, ‘Space Settlements, Property Rights, and International Law: Could a Lunar Settlement Claim the Lunar Real Estate it needs to Survive?’ (2008) 73 J. of Air L. & Com. 37, 48-50

⁴¹Margaret Davies, *Property: Meanings, Histories, Theories* (Routledge-Cavendish 2007), 65

Both the Outer Space Treaty and the Moon Agreement use the phrase “outer space, including the moon and other celestial bodies.” However, there is no clear definition as to what actually constitutes a celestial body. It is not even clear whether asteroids are celestial bodies. As the term ‘celestial bodies’ is not a clearly defined legal concept it may be possible to circumvent the non-appropriation principle by exploiting the term’s ambiguity, at least with regards to asteroids.⁴²

There are several kinds of celestial body: galaxies, stars, planets, moons, asteroids, comets and even specks of dust could be considered celestial bodies.⁴³ A number of authors have raised the notion that asteroids and comets should not be considered celestial bodies, at least in the legal sense. Some have raised the notion of a minimum size of a natural object in order for it to be considered a celestial body.⁴⁴ Ernst Fasan feels that the drafters of the treaties had “substantial natural objects in mind” when they used the phrase ‘celestial bodies.’⁴⁵ Of course, Dr Fasan does not elaborate on what constitutes ‘substantial.’

Virgiliu Pop has argued that it could be interpreted from the text of the Outer Space Treaty that a celestial body needs to be big enough to land on. He also argued that taking an approach to the question he called the ‘control approach’ would mean that an object that can be moved by human action is therefore ‘movable’ and is thus not a celestial body and would in fact become available for appropriation. Change of the asteroids status and creation of ownership might occur at the moment it was moved by artificial means.⁴⁶

⁴²Pop, *Who Owns the Moon?* (n 5), 58

⁴³Fasan, ‘Asteroids and other Celestial Bodies...’ (n 4), 34-36

⁴⁴*Ibid*, 36-38

⁴⁵*Ibid*, 40

⁴⁶Pop, *Who Owns the Moon?* (n 5), 44-55

Which could mean that asteroids which are small enough to be moved from their orbits by artificial means are not celestial bodies, however this definition runs into the problem that as technology develops it could be possible to move bigger and bigger asteroids. It is theoretically possible to move a 500-ton asteroid to high lunar orbit using currently available technology, as demonstrated in a recent study produced for NASA by the Keck Institute for Space Studies at the California Institute of Technology's Jet Propulsion Laboratory.⁴⁷

The passage of the US Commercial Space Launch Competitiveness Act⁴⁸ has once again brought the issue of space property rights, particularly regarding asteroid mining, into the media spotlight. The new law is intended "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."⁴⁹ Title IV of the Space Resource Exploration and Utilization Act of 2015 is specifically intended to create a property rights framework for the extraterrestrial mining industry, at least for US based companies.

The Space Resource Exploration and Utilization Act of 2015 (as Title IV of the CSLCA is known) has provoked considerable controversy as it seemingly conflicts with Article II of the Outer Space Treaty. As under the Act the US grants itself the right to grant property rights over asteroid resources to US companies the Act could be seen as US trying to claim property rights over space resources (which it would presumably have to do in order to grant them to others) which would violate Article II

⁴⁷John Brophy, Fred Culick, Louis Friedman, et al, *Asteroid Retrieval Feasibility Study* (2012) <http://www.kiss.caltech.edu/study/asteroid/asteroid_final_report.pdf> accessed 06 February 2016

⁴⁸US Commercial Space Launch Competitiveness Act, Public Law 114-90, 114th Congress, 25 November 2015, 51 U.S.C. (CSLCA)

⁴⁹*Ibid*, preamble

of the Outer Space Treaty.⁵⁰ The Act does require this to be done in “accordance with the international obligations of the United States”⁵¹ and makes the disclaimer that “the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”⁵² However, the practical effect of this is still unclear.

The law relating to space resources has been a sizeable ‘gap’ in the *Corpus Juris Spatialis*. Despite the promulgation of two national laws relating to space mining it remains so. The main studies on property rights in outer space have focused on the Moon or Earth orbit. Considering that there are companies proposing to mine the asteroid belt and the potential contribution to the future of humanity the industry could make, it is a topic well worth researching.

Entrepreneurs and businesses want and need a favourable legal framework,⁵³ if for no other reason than “to be assured that the security of the return on investment afforded by ‘terrestrial property law’ will be available for investments in space.”⁵⁴ The Space Resource and Exploration Act is intended to provide this security, however as it is a unilateral action taken by the United States without the consultation of any other state it may in fact generate more uncertainty and conflict than had custom been allowed to develop. It may lead to a land rush in space which is exactly what the drafters of the Outer Space Treaty intended to avoid.⁵⁵

Space resource activities are likely to happen, when remains an open question however if humanity is to extend its reach into space it needs to happen because, as Jim Benson

⁵⁰Fabio Tronchetti, ‘The Space Resource Exploration and Utilization Act: A Move Forward or a Step Back?’ (2015) 34 Space Policy 6, 8

⁵¹CSLCA (n 48), § 51302(a)(2), § 51302 (a)(3)

⁵²*Ibid* § 403

⁵³Gennady M. Danilenko, ‘Outer Space and the Multilateral Treaty-Making Process’ (1989) 4 Berkley Tech. L.J. 217, 218

⁵⁴Lyall and Larsen, *Space Law* (n 18), 567

⁵⁵Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Johns Hopkins University Press 1997), 187

used to say, ‘in order to go to space to stay, we have to make space pay.’⁵⁶ The current space law regime is not perfect but it does a lot to prevent conflict in space and its preservation is important. If the space law regime is seen as obstructing space resource utilization then it is likely to be discarded, which could be disastrous.

It is also worth noting a few definitions, as used throughout this work. The definition of space resource is seemingly now agreed upon. The US Title IV, the Luxembourg Space Resources law and the Hague Building Blocks all use some variation of “an extractable abiotic resource *in situ* in outer space.” This is a new definition for space law as it does not appear in any of the five space treaties, not even the Moon Agreement. However, it is similar to the definition of ‘resources’ found in UNCLOS⁵⁷ and this definition brooked little opposition at the several sessions of UNCOPUOS Legal Subcommittee since the enactment of the US Title IV. When discussing space resources in this work, this is the definition that should be referred to.

Additionally, the term ‘ore’ is also utilized in several sections of this work, it is not used in the geological sense but the economic and mining industry sense of a concentration of resources which are economically viable to extract and market for profit.⁵⁸ What constitutes an ‘ore bearing’ deposit obviousity fluctuates with the varying cost of extraction and transport as well as the market price, so what today is not an ‘ore bearing’ asteroid may become one tomorrow and vice versa.

⁵⁶Mark Alpert, ‘Making Money in Space’ (1999) 10 Scientific American Presents 92; Rex Ridenoure, ‘NEAP: 15 years later’ (*The Space Review*, 17 June 2013) <<http://www.thespacereview.com/article/2315/1>> accessed 10 June 2015

⁵⁷United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS), Article 133(a); Yoshifumi Tanaka *The International Law of the Sea* (2nd edn. CUP 2015), 180

⁵⁸Angus Stevenson and Maurice Waite eds. *Concise Oxford English Dictionary* (12th edn. OUP 2011), 1008

1.3 Research Question and Hypothesis:

These research questions focus on the core issues relating to the ‘legality’ of space resource activities. Property rights are important, they provide security and a necessary degree of certainty. Entrepreneurs and businesses want and need a favourable legal framework,⁵⁹ if for no other reason than “to be assured that the security of the return on investment afforded by ‘terrestrial property law’ will be available for investments in space.”⁶⁰ However, there has been a general presumption that the non-appropriation principle articulated in Article II of the Outer Space Treaty prevents States from granting property rights to their nationals (and even from nationals ‘obtaining’ property rights without State intervention). Whether this applies to resources has been the big unanswered question, even from the existing scholarly work. The United States and Luxembourg assert that resources are appropriable once extracted from celestial bodies and that their national legislation conforms with the requirements of the Outer Space Treaty. The overarching research question of this work could be simplified as asking whether that is true? However, there is of course more to it than that, hence the research questions listed below.

1.3.1 Does a national space resources property rights regime constitute national appropriation by means of sovereignty or any other means as found in Article II of the Outer Space Treaty?

The first research question that needs to be addressed is whether the national or ‘unilateral’ approach being undertaken by the United States and Luxembourg constitutes national appropriation. While, of course, part of this will involve looking at the contents of the United States and Luxembourg space resources law, it has to be a broader question. Particularly in the case of the United States it is clear that the law

⁵⁹Danilenko, ‘Outer Space and the Multilateral Treaty-Making Process’ (n 53), 218

⁶⁰Lyall and Larsen, *Space Law* (n 18), 567

passed in 2015 is a first step and therefore it is premature to overly fixate on the specifics of the initial legislation. However, there is also the fact that other States are and may consider national legislation of their own and in order for the result of this enquiry to be relevant to them it needs to be more general, this enquiry is not specifically about the US legislation but rather the use of such national legislation to ‘govern’ space resource activities, of which the US legislation is the pioneer. Further, the nature of property needs to be understood in order to properly assess whether the ‘granting’ or ‘recognizing’ of property rights is inherently a sovereign act of appropriation in violation of the non-appropriation principle. Of course, this also, inherently, involves producing a clearer understanding of what the Outer Space Treaty means by ‘national appropriation’.

1.3.2 What is the legal definition of a celestial body and are asteroids celestial bodies

The second research question is a subquestion regarding the scope of application of the non-appropriation principle. The non-appropriation principle applies to outer space including the Moon and other celestial bodies. However the Outer Space Treaty does not provide a definition of ‘celestial bodies’ (nor for that matter outer space, but that is outside the scope of this enquiry as ‘resources’ are taken to be things like minerals or water in line with the Hague Group definition⁶¹, sunlight and orbits are construable as resources but owing to fundamentally different natures they are not included within the conception of ‘resources’ as explored by this work) and Pop has suggested that certain asteroids might not be ‘celestial bodies’ and therefore could be appropriable.⁶²

⁶¹The Hague Working Group Building Blocks on Space Resource Activities 2019
<<https://www.universiteitleiden.nl/binaries/content/assets/rechtsgeleerdheid/instituut-voor-publiekrecht/lucht--en-ruimterecht/space-resources/bb-thissrwg--cover.pdf>> accessed 9 January 2020, Building Block 2.1 (see also footnote 2 on page 1)

⁶²Pop, ‘A Celestial Body is a Celestial Body is a Celestial Body...’ (n 5); Pop, *Who Owns the Moon?* (n 5), 58

Further with regards to this question is whether a resource continues to be ‘part of’ the celestial body once it has been extracted, if it does then it may not be possible to take ownership of extracted resources, given Article II OST.

1.3.3 Does the distinction between personal and territorial jurisdiction/sovereignty allow for the development of a legal regime to govern space resource activities?

The exercise of jurisdiction in the modern international system is inherently territorial in nature. However, States are able to exercise ‘extraterritorial jurisdiction’ over their nationals. Indeed, Article VI of the Outer Space Treaty essentially requires it and Article VIII provides the mechanism for doing so. The third research question essentially asks whether this gives states sufficient authority to govern space resource activities. Is it important that national laws focus on authorising activities rather than granting property, priority, or mining rights over specific areas? This question also ties in with the first question regarding a national or international approach, as even if there is scope for states to authorise and regulate such activities there is still the question of what international measures that would be necessary in order to ensure cooperation and avoidance of harmful interference or even outright conflict, particularly if the number of viable ‘ore bearing’ celestial bodies proves limited.

1.4 Research Methodology:

The methodology of this work is predominantly a socio-legal approach. Socio-legal is meant in the sense of placing law within its broader context, not in the narrower ‘sociological’ use, furthermore, it is an inherently interdisciplinary approach.⁶³ In order to fully examine the institutions of property and sovereignty it is necessary to investigate them within their political, economic, philosophical and historical context.

⁶³Fiona Cownie and Anthony Bradney ‘Socio-legal studies: A Challenge to the doctrinal approach’ in Dawn Watkins and Mandy Burton (eds) *Research Methods in Law* (2nd edn. Routledge 2017), 42-43

This logic is enhanced with the additional considerations of international law which is often influenced as much, if not more, by politics than law. This however does not preclude an in-depth examination of relevant texts such as the Outer Space Treaty (Article II, in particular) and the US and Luxembourg legislation on space mining as well as the work of UNCOPUOS and The Hague Space Resources Governance Working Group. This work takes a positivist approach to the nature of law, which influences the assessment of the nature of so-called ‘gaps’ in international law. Quane argues that there are two approaches to take towards the sources of international law either they are a ‘snap shot’ at particular moment, or a ‘moving image’ that allows for evolving view. Quane argues that ‘moving image’ view is not only more useful but also probably more applicable, at least in international law.⁶⁴ This work utilizes the ‘moving image’ approach. This sits well with applying the evolutionary interpretation to the Outer Space Treaty. The evolutionary interpretation recognizes that the meaning of the terms of a treaty can change over time. Gardiner suggests there are three elements that indicate the evolutionary approach may be appropriate 1) the use of language in the treaty is adapted to evolve such as the use of ‘generic’ terms 2) the treaty has a long or indefinite duration and 3) there was a presumption or awareness of the parties that terms would evolve.⁶⁵ The Outer Space Treaty meets all three of these ‘criteria’. Indeed, the drafters of the OST expressed an expectation that an evolutionary, developmental approach to space law would be taken, which is why they stick to general principles in the OST.⁶⁶

⁶⁴Helen Quane, ‘Silence in International Law’ (2014) 84 BYBIL 240, 243

⁶⁵Gardiner, *Treaty Interpretation* (n 26), 467-471

⁶⁶UNCOPUOS 'Summary Record of the Sixty-First Meeting' (20 October 1966) UN DOC A/AC.105/C.2/SR.61, 8; UNCOPUOS 'Summary Record of the Sixty-Third Meeting' (20 October 1966) UN DOC A/AC.105/C.2/SR.63, 11; UNCOPUOS 'Summary Record of the Sixty Eight Meeting' (21 October 1966) UN DOC A/AC.105/C.2/SR.68, 10

Regarding scientific and engineering research the approach was to utilize work from leading figures in their respective fields, particularly those pieces which had been intended for a non-specialist audience. A broad approach to these fields was undertaken, recognizing that the primary value was to inform and contextualize a legal analysis rather than stand on its own as scientific or engineering scholarship. Heading Paul Roberts warnings about the potential dangers of interdisciplinary legal research.⁶⁷ As well as Jenks, reminder that while “scientific facts and evidence” are important for space law, they “should not be regarded as independent sources of legal obligation... but as important, and in the case of the scientific facts vital, considerations within this accepted framework of legal obligation governing international relations generally.”⁶⁸ This research is primarily document focused and library-based research. The Outer Space Treaty forms the core focus upon which the enquiry is centred, though of, course other treaties, as well as General Assembly Resolutions, ICJ case law, national legislation, UN Documents and secondary legislation are utilized. A wealth of information is available via online data bases, with the United Nations archive, including verbatim transcripts of treaty negotiations, being available on the UN website. Interviews with stakeholders were eschewed for primarily two reasons, first, as has been demonstrated by the collapse of Deep Space Industries and Planetary Resources (and the Obama-Trump transition), while the categories of stakeholders will not change, the actual stakeholders themselves will undoubtedly change. Second, interviews with stakeholders was likely to result in little, industry representatives made clear they considered legal opinions ‘proprietary’ and were unwilling to divulge much

⁶⁷Paul Roberts, 'Interdisciplinary in Legal Research' in Mike McConville, and Wing Hong (Eric) Chui, *Research Methods for Law* (Edinburgh University Press 2017), 96-99

⁶⁸Jenks, *Space Law* (n 34), 183

detail even under Chatham House rule, and government representatives did not diverge from the documented record, at least not when willing to be used as a source. Alternate approaches were considered, given the centrality of property to this work a Marxist approach was considered, as was a post-colonial approach, particularly given the anti-colonial nature of Article II of the Outer Space Treaty. However, both these would likely have resulted in more critical conclusions. Stakeholders and potential impact need to be considered. That is not to suggest shying away from controversy or critical conclusions but merely a recognition that adopting a methodological approach that would result in a significant proportion of this work's stakeholders dismissing it out of hand necessarily limits the impact of the work. However, to quote Paul Roberts,

This still does not imply automatic deference to prevailing orthodoxies or toadying to the powers that be. Some of the most incisive critics of liberal legality are card-carrying liberals, whose criticisms are all the more incisive precisely because they take liberal ideals seriously and know them, intimately and accurately, from an 'appreciative' insider perspective.⁶⁹

1.5 Intended Outcomes:

The intended outcome of this work is to identify how a space resources property rights regime is possible given the non-appropriation provisions of the Outer Space Treaty. Part of this involves understanding the nature of the freedom of use in Article I of the Outer Space Treaty. In order to develop this understanding it is necessary for this work to involve the examination of what it means to 'use' outer space, including the Moon and other celestial bodies, particularly whether this includes exploitation of resources found within those bodies specially if it is done for commercial purposes. In order to answer this, it necessary to understand freedom of use within the context of the prohibition on 'national appropriation' within Article II of the Outer Space Treaty.

⁶⁹Roberts, 'Interdisciplinary in Legal Research' (n 67), 96

However, it is not clear what that means. Resources are not specifically mentioned in the treaty itself and the formulation suggests that is meant to thwart activities or assertions as being the basis for any claim to rights rather than prevent the activities themselves.

It is also important to discover whether such a regime is possible by the ‘sovereign’ or ‘unilateral’ action of a State by virtue of national legislation or whether it needs to be an international or multilateral regime. Regarding an international approach there are two possibilities, one is that there is a legal requirement for an international regime, possibly by virtue of the *res communis* nature of outer space, the other is that it is a practical necessity in order to ensure cooperation, coordination, and mutual recognition.

1.6 Overarching Summary:

Chapter Two provides background and context on space resources. It will show that space resource activities (space mining) are a plausible industry which is in the process of being developed. Furthermore, States (such as the United States and Luxembourg) are taking this prospect seriously and have introduced legislation to regulate it. This provides an impetus to the international legal community to take the issues raised seriously. Furthermore, chapter one argues that it is necessary to take consideration of the actual, physical distribution of resources when devising a property rights regime or legal framework for space resources. This chapter provides a clear overview of space resources as a subject, laying a foundation for the rest of the enquiry.

Chapter Three provides an overview of the relevant elements of Public International Law. This provides an overview of the framework within which which space law operates and an understanding of the basis for much of the work of this enquiry, particularly the understanding of treaty interpretation employed. It also argues that

while space law is indeed a ‘special regime’ it is part of international law, as indicated by Article II of the Outer Space Treaty. Furthermore, it addresses so-called ‘gaps’ in international law and how to view them. It argues that such ‘lack of provision’ should not be regarded as a ‘gap’, which assumes a natural ‘completeness’ and is not appropriate in a positivist framework but as a ‘silence.’

The chapter also presents Customary International Law as an important piece of the puzzle which provides a process for the evolution of international law. While who qualifies as a ‘specially affected state’ might be unclear in the context of outer space (theoretically all states could be spacefaring, unlike landlocked states which cannot become coastal states) that *opinio juris*, particularly when expressed at a forum like UNCOPUOS, can drive an accelerated development of new customary international law, particularly if there is State Practice to support it (such as national legislation) is reasonable given the framework of international law and its fundamental nature as a voluntary state led process. *Opinio juris* on space resources has not formed, however it is crystallising. Finally, the case is made that soft law provides a potentially useful avenue to creating a coordinating international framework which while not as robust as a ‘hard law’ approach would provide flexibility which given the embryotic nature of space resource activities is desirable.

Chapter Four provides an overview of the relevant space law treaties. The focus is primarily on the Outer Space Treaty although as Article 11 of the Moon Agreement is relevant it is also discussed. The chapter does not examine all articles of the Outer Space Treaty but instead focuses on the most relevant ones, Article I and the definition of ‘use’ and Article II and the ‘non-appropriation principle’ being primary focuses. Both of which are critical to this enquiry. However, Article III which firmly plants space law within broader international law is also looked at, as is Article VI which is

key to bringing non-governmental actors under the obligations of the Outer Space Treaty, albeit via the 'responsible' state. Article VII is also looked at as it provides the basis for the exercise of 'jurisdiction and control' over space objects and their personnel.

Chapter Five delves into the question of what constitutes a celestial body as the term is used in the Outer Space Treaty. This is a crucial question as it speaks to the scope of application of the non-appropriation principle. If certain asteroids or other naturally occurring bodies could be considered not to be 'celestial bodies' then they would not be subject to the non-appropriation principle. The chapter looks at the treaties, and what space law scholars have said. It takes a look at the 'plain ordinary meaning' of the term as well as the scientific understanding of the term.

Chapter Six examines the history of the concept of property. John Locke looms large in property theory however as this chapter demonstrates his history is flawed. Property did not precede the state, indeed property, as a legal phenomenon, requires the state and the law in order to exist. The actual history of property also provides further support for the 'bundle' approach, as the 'absolute' model, to the extent that it ever existed, was a short lived, and a 'recent' development of the Early Modern era, as this chapter will demonstrate. Further, this chapter will argue that property does not and has not always been virtually synonymous with land, indeed in the early English common law it primarily referred to 'movable' goods which shaped thinking about it. Further, as this chapter will demonstrate, there are alternative models, particularly from the pre-Modern era which allow for multi and variable use of areas with or without 'ownership' or 'appropriation' of the territory which may prove useful for the future governance of activities in outer space.

Chapter Seven will address the theoretical and philosophical approaches to understanding property. The first section of the chapter will discuss the common notion that property is a ‘thing’ and that this view is mistaken, though popular. It will reframe the nature of property as about ‘rights’ and relations between individuals regarding ‘things.’ The next section will look at the natural school of property, as exemplified by the work of John Locke. It will dismiss this approach to property rights; however, it is vital to examine it given the influence of Locke in Anglo-American thinking and the ‘Lockean’ reasoning expressed in the US space resources legislation of 2015. The following section will focus on the ‘bundle of rights’ approach which is the dominant paradigm in modern legal scholarship. It will focus on the elements of ‘exclusion’ and ‘use’ while questioning whether or not they are equal. The next section Will look more explicitly at the relationship between property and the state, particularly its nature as an institution for managing the distribution and use of resources and the societal context it has as a result. The following section will discuss the role of enforcement and the rule of law which is not only vital in order for property rights to have any practical or economic meaning but also one of the main potential hurdles regarding space resources. This, as mentioned, will help to reinforce the argument that it is necessary, practically if not legally speaking, for there to be an international space resources governance framework in order to effectively enforce property rights. Finally, alternatives to the mainstream approaches to property will be discussed, from Proudhon, who ‘famously’ declared that ‘property is theft’⁷⁰ to Elinor Ostrom’s ‘common pool resources’, and the notion of stewardship.

⁷⁰Pierre-Joseph Proudhon, Donald R. Kelly and Bonnie G. Smith (eds, trans) *What is Property?* (CUP 2008), 13

Chapter Eight will examine the concepts of sovereignty and jurisdiction and how they apply to outer space. Sovereignty underpins the international order and jurisdiction is how States exercise their power and determines over whom they can do so. Therefore, it is imperative that an examination of the concepts is undertaken.

The first section of this chapter examines sovereignty in its modern form. It recognizes that at its core sovereignty is about the exercise of power. Furthermore, sovereignty is inherently territorial in nature, at least in the 'post-Westphalian' conception, which is why it is generally presumed to be banned from 'outer space.' The following section examines the nature of territory, which is the basis for territorial sovereignty, however it highlights that there are alternative variants of the exercise of sovereignty which are discussed in later sections of the chapter. The next section discusses how sovereignty continues to evolve, particularly beyond the 'Westphalian' 'territorial' model. This has relevance because future developments may prove more amiable to the intentions of the Outer Space Treaty. The following section takes a step back and looks at the origins of sovereignty, highlighting that it is not a monolithic or static concept. As well as conceptions of sovereignty as being about rule over people rather than territory as was generally the case in the middle ages. A conception which would not conflict with Article II OST and indeed survives as one of the forms of 'extraterritorial jurisdiction' in modern international law. The next section builds on the 'origins of sovereignty section' and examines developments primarily in the 17th century as European states began to extend their power beyond their European territorial domains. It focuses in particular of exercise of authority at sea which has direct analogy to outer space. The final section discusses jurisdiction itself with a specific focus on extraterritorial jurisdiction as this is the version that can be exercised by states in outer space.

However, it underlines that the key to jurisdiction beyond having the right to exercise authority is having the power to do so.

Chapter Nine discusses the ongoing developments relating to space resources. It examines the legal and policy frameworks in the United States and Luxembourg, as well as the ongoing discussions at the UN and The Hague International Space Resources Governance Working Group. This is important, international law is not static. The actions and views of states push the development of international law, and as this chapter demonstrates, the views of states on the legal issues around space resources are in development.

Finally, in the conclusion (Chapter 10) the research questions will be answered, solutions provided, scope for further work identified and a final summary of the work detailed. Having outlined the structure of this work, the discussion will initiate by addressing the first research question starting with background and context on space resources.

Chapter Two: Space Resource Activities

2.1 Introduction

In 2012 two US based companies, Planetary Resources and Deep Space Industries, announced their existence and their intention to mine asteroids.⁷¹ Predictions of the dawn of a ‘space gold rush’ and the launch of a trillion-dollar industry were abundant.⁷² The United States in the Commercial Space Launch Competitiveness Act of 2015’s Title IV⁷³ enacted national legislation to lay the foundation for the ‘authorising and supervising’ of space resource activities. Luxembourg followed suit with their own space resource activities legislation in 2017⁷⁴, and invested in space

⁷¹Adam Mann, ‘Tech Billionaires Plan Audacious Mission to Mine Asteroids’ (*Wired*, 23 April 2012) <<https://www.wired.com/2012/04/planetary-resources-asteroid-mining/>> accessed 9 January 2020; ‘Planetary Resources: The New Asteroid Mining Project Backed by James Cameron and the Google Executives’ (*The Verge*, 18 April 2012) <<https://www.theverge.com/2012/4/24/2971461/planetary-resources-mining>> accessed 9 January 2020; Rod Pyle, ‘Deep Space Industries: A New Asteroid-Mining Company Is Born’ (*Space.com*, 28 January 2013) <https://www.space.com/19462-asteroid-mining-deep-space-industries-birth.html> accessed 9 January 2020

⁷²Elizabeth Pearson ‘Space Mining: the New Goldrush’ (*Science Focus*, 11 December 2018) <<https://www.sciencefocus.com/space/space-mining-the-new-goldrush/>> accessed 9 January 2020; Andrew Wong, ‘Space Mining Could Become a Real Thing - And It Could Be Worth Trillions’ (*CNBC*, 15 May 2018) <<https://www.cnbc.com/2018/05/15/mining-asteroids-could-be-worth-trillions-of-dollars.html>> accessed 9 January 2020; Neel V. Patel, ‘Asteroid Mining Could be a Multi-Trillion Dollar Buisness by 2020’ (*Inverse*, 28 June 2017) <<https://www.inverse.com/article/33556-asteroid-mining-multi-trillion-dollar-business-asteroid-day-2017>> accessed 9 January 2020; Calla Cofield, ‘Extraterrestrial Gold Rush: What’s Next for the Space Mining Industry’ (*Space.com*, 21 November 2016) <<https://www.space.com/34774-whats-next-for-space-mining.html>> accessed 9 January 2020; Morgon Saletta and Kevin Orrman-Rossiter ‘All of Humanity Should Share in the Space Mining Boom’ (*The Conversation*, 17 April 2016) <<http://theconversation.com/all-of-humanity-should-share-in-the-space-mining-boom-57740>> accessed 9 January 2020; Rob Davies, ‘Asteroid Mining Could be Space’s New Frontier: The Problem is Doing it Legally’ (*The Guardian*, 6 February 2016) <<https://www.theguardian.com/business/2016/feb/06/asteroid-mining-space-minerals-legal-issues>> accessed 9 January 2020

⁷³CSLCA (n 48), Title IV

⁷⁴Loi du 20 juillet 2017 sur l’exploration et l’utilisation des ressources de l’espace - (Law of 20 July 2017 on the exploration and use of space resources) Doc. parl. 7093; Sess. Ord. 2016-2017 - <http://data.legilux.public.lu/file/eli-etat-leg-loi-2017-07-20-a674-jo-fr-pdf.pdf> (Luxembourg) Unofficial English translation available at: - <https://spaceresources.public.lu/content/dam/spaceresources/news/Translation%20Of%20The%20Draft%20Law.pdf>

resource ventures such as Planetary Resources.⁷⁵ There was a considerable response from the international community (or at least the segment that pays attention to such things) and it has featured as a topic at the United Nations Committee on the Peaceful Uses of Outer Space's (UNCOPUOS) Legal Subcommittee for the last several years⁷⁶. It has also spawned at least one effort to draft a multilateral 'framework' on space resource activities, The Hague International Space Resources Governance Working Group⁷⁷ (the author is a member of this working group). However, the space resources 'bubble'⁷⁸ may already have burst, as both Deep Space Industries and Planetary Resources have been acquired by others⁷⁹ and are effectively out of the 'space mining' 'game' whatever their new owners' long terms plans may be. There are other companies pursuing space resource activities, but a lot of the wind does seem to have gone out of the sails of the industry. However, space resource activities continue to be discussed at UNCOPUOS and States are continuing to develop national legal frameworks on space resource activities.

The purpose of this chapter is to provide an overview of space resource activities; what is being proposed and some discussion of who has and still is proposing undertaking

⁷⁵Sarah Scoles 'Luxembourg's Bid to Become the Silicon Valley of Space Mining' *Wired* (*Wired*, 1 October 2017) <<https://www.wired.com/2017/01/luxembourg-setting-silicon-valley-space-mining/>> accessed 9 January 2020; David Z. Morris 'Luxembourg to Invest \$227 Million in Asteroid Mining' (*Fortune*, 5 June 2016) <<http://fortune.com/2016/06/05/luxembourg-asteroid-mining/>> accessed 9 January 2020

⁷⁶UNCOPUOS, 'Report of the Legal Subcommittee on its fifty-seventh session, held in Vienna from 9-20 April 2018' (30 April 2018) UN Doc A/AC.105/1177; UNCOPUOS, 'Report of the Legal Subcommittee on its fifty-sixth session, held in Vienna from 27 March to 7 April 2017' (18 April 2017) UN Doc A/AC.105/1122; UNCOPUOS, 'Report of the Legal Subcommittee on its fifty-fifth session, held in Vienna from 4 to 15 April 2016' (27 April 2016), UN Doc A/AC.105/1113

⁷⁷'The Hague International Space Resources Governance Working Group' (n 3)

⁷⁸Jeff Foust, 'The Asteroid Mining Bubble has Burst' (*The Space Review*, 7 January 2019) <<http://www.thespacereview.com/article/3633/1>> accessed 8 January 2019

⁷⁹Jeff Foust, 'Deep Space Industries Acquired by Bradford Space' (*SpaceNews*, 2 January 2019) <<https://spacenews.com/deep-space-industries-acquired-by-bradford-space/>> accessed 3 January 2019; Jeff Foust, 'Asteroid Mining Company Planetary Resources Acquired by Blockchain Firm' (*SpaceNews*, 31 October 2018) <<https://spacenews.com/asteroid-mining-company-planetary-resources-acquired-by-blockchain-firm/>> accessed 1 November 2018

these activities. This provides a background understanding of what the legal discussion is about as well as evidence for why this exercise is necessary. This chapter also examines the ‘sustainability’ of space resources which has relevance for discussions of distribution and access, particularly important given the provisions of Article I of the Outer Space Treaty. This chapter will demonstrate that space resource activities have considerable potential value and are technically feasible. However, it will also show that whilst there is an overall abundance of resources in outer space their distribution and accessibility create potential for conflict. Further, given the finite nature of non-renewable resources there is a need for consideration of the sustainable use of resources in order to prevent their abrupt depletion even if that point may not be for several centuries. These aspects will be built upon in later chapters as part of an overarching argument for the necessity of a governance framework for space resource activities.

The first section discusses space resources generally, the quantity of material and its high-level value as well as the potential uses for this material. This section also discusses the industry that is developing and some of its recent history. The second section discusses the distribution of these resources in more detail, relying on the work lead by planetary scientist Martin Elvis, who is a leading scientific figure and one of the few to have considered the questions of the ‘economic viability’ of asteroid mining, in this level of detail. As mentioned, the purpose of these sections, and this chapter, is provide a background for the further discussion of space resource activities in subsequent chapters.

2.2 A ‘Gold Rush’ in Space?

This section will discuss the basis upon which the case for space resource activities is made, that there is a huge quantity of material available in the solar system which will

facilitate future human activity in outer space. It will also discuss the companies that have and still are planning to conduct space resource activities. While the main focus of this thesis is the socio-legal questions relating to the governance and regulation of space resource activities it is vital to understand what those activities actually are, which is the focus of this chapter and this section specifically. This section will demonstrate that while predicting when or how space resource activities will be conducted is challenging, that they will occur at some point in the foreseeable future is a reasonable basis upon which to proceed.

An initial survey of the resources of the solar system makes a compelling case for ‘space mining,’ extraterrestrial resource utilization or space resource activities. It is clear that there are substantial quantities of precious, valuable, and useful metals in asteroids as well as abundant quantities of water, mostly in the form of ice, on asteroids, comets, planets, and moons. For example, it has been suggested that Amun, a fairly small Near-Earth Object (NEO) with a mass of approximately 30 billion tons, contains approximately \$8,000 billion in iron and nickel, \$6,000 billion in cobalt and \$8,000 billion in platinum group metals. Similar estimates have projected that the asteroid belt also contains about four billion tons of uranium.⁸⁰ Whilst the Moon and other planets may have even more lucrative resources, asteroids, and in particular NEOs, have the added lure of being “the most easily reachable bodies within the entire solar system.”⁸¹ There are estimated to be 20,000 NEOs larger than 100m diameter, all capable of being mined in the near future, given sufficient investment.⁸²

⁸⁰John S. Lewis, *Mining the Sky: Untold Riches from the Asteroids, Comets and Planets* (Helix Books 1997), 112, 193, 197

⁸¹M. Di Martino, A. Carbognani, G. De Sanctis, V Zappala and R. Somma, *The Asteroid Hazard: Evaluating and Avoiding the Threat of Asteroid Impacts* (1st edn., European Space Agency 2009), 195

⁸²Martin Elvis, ‘Prospecting Asteroid Resources’ in Viorel Badescu (eds), *Asteroids: Prospective Energy and Material Resources* (Springer 2013), 81-129, 81

As well as their relative convenience and abundance of minerals, another aspect of asteroids and NEOs that makes them attractive propositions for resource activity ventures is the potential to utilize water which is present on such bodies.⁸³ Water is a valuable commodity in space; it can be used for drinking, bathing and cleaning but it can also be used to make air and rocket fuel. As it costs \$20,000 to put a typical 500ml bottle of water into orbit it would be vastly more efficient and cost effective to use a space-based source of water rather than rely on a supply from Earth.⁸⁴ Asteroid mining for water ice is technologically feasible and would be achievable using established technology.⁸⁵

The production of fuel in space would be a gamechanger for the development of the solar system, reducing the cost of access to space dramatically. One industry, on-orbit servicing, is, much like the space resource activities sector, a developing and embryonic industry which would greatly benefit from a comparatively cheap source of fuel.⁸⁶ Additionally, established space companies such as the United Launch Alliance (ULA) have indicated that they would be willing to pay \$3,000 for a kilogram of propellant delivered to Low Earth Orbit.⁸⁷ This projection fits well with the assessment made by Lewis, that delivery to Earth orbit for less than \$10,000 per

⁸³John S. Lewis *Asteroid Mining 101: Wealth for the New Space Economy* (Deep Space Industries 2015), 107-113; Michael K. Shepard *Asteroids: Relics of Ancient Time* (CUP 2015), 308-309; Alpert, 'Making Money in Space' (n 56), 94-95; John S. Lewis, 'Tapping the Waters of Space' (1999) 10 *Scientific American Presents* 100, 100-103

⁸⁴Shepard *Asteroids* (n 83), 308-309

⁸⁵Lewis, 'Tapping the Waters of Space' (n 83), 103

⁸⁶Caleb Henry 'Airbus to Challenge SSL, Orbital ATK with New Space Tug Business' (*SpaceNews*, 28 September 2017) <https://spacenews.com/airbus-to-challenge-ssl-orbital-atk-with-new-space-tug-business/?utm_content=buffer46444&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer> accessed 29 September 2020; Caleb Henry 'MDA Restarts Satellite Servicing Business with SES as first Customer' (*SpaceNews*, 29 June 2017) <<https://spacenews.com/mda-restarts-satellite-service-business-with-ses-as-first-customer/>> accessed 4 July 2017

⁸⁷Leonard David, 'Inside ULA's Plan to Have 1,000 People Working in Space by 2045' (*Space.com*, 29 June 2016) <<https://www.space.com/33297-satellite-refueling-business-proposal-ula.html>> accessed 9 January 2020

kilogram would be competitive with Earth launched material.⁸⁸ In the future, it is not difficult to envisage the creation of a series of space-based ‘filling stations’ processing locally sourced water and facilitating travel into the solar system.

The Moon is also attracting considerable attention. Moon Express and iSpace⁸⁹ are both companies that exploring the development of technology capable of exploiting lunar resources. Despite talk of mining the Moon for Helium-3 the main focus, as with asteroids, is water ice. This is especially the case if the resources were in support of a manufacturing or servicing industry in low earth orbit, supporting lunar bases and/or a developing cis-lunar economy⁹⁰. At present, such discussions may seem somewhat far-fetched, yet the proposals for a Moon village from ESA⁹¹ and commercial ‘space hotels’ from Bigelow Aerospace⁹² illustrate that such ideas could soon emerge as serious propositions. It is even now evident that Mars has “large quantities of nearly pure water ice at the surface of Mars that is concentrated in huge debris-covered glaciers”⁹³ which would enable the support of surface operations and eventually settlement.

It was this potential bonanza that prompted the formation of two companies Planetary Resources and Deep Space Industries. They announced their intentions to commence commercial asteroid resource activities within the near future in April 2012 and

⁸⁸Lewis *Asteroid Mining 101* (n 83), 113

⁸⁹Chloe Cornish 'Interplanetary Players: A Who's Who of Space Mining' (*Financial Times*, 19 October 2017) <<https://www.ft.com/content/fb420788-72d1-11e7-93ff-99f383b09ff9>> accessed 19 October 2017

⁹⁰Leonard David 'Is Moon Mining Economically Feasible?' (*Space.com*, 7 January 2015) <<https://www.space.com/28189-moon-mining-economic-feasibility.html>> accessed 9 January 2020

⁹¹Jan Woerner 'Moon Village: A Vision for Global Cooperation and Space 4.0' ESA Ministerial Council 2016 <http://m.esa.int/About_Us/Ministerial_Council_2016/Moon_Village>

⁹²Dinah Eng 'Robert Bigelow is Building Hotels in Space (No, Really)' (*Fortune* 19 May 2016) <<http://fortune.com/2016/05/19/robert-bigelow-hotels-space/>> accessed 20 May 2016

⁹³Fabrizio Bernardini, Nathaniel Putzig, Eric Petersen, Angel Abbud-Madrid and Valentina Giacinti 'Implications for Resource Utilization on Mars - Recent Discoveries and Hypotheses' (2018) 71 *JBIS* 186, 188

January 2013, respectively.⁹⁴ This kicked off the most recent space mining ‘boom’,⁹⁵ however, this was not the first time plans to mine asteroids have been announced, nor is it the first time that it has been suggested that space resource activities are on the verge of becoming a reality. Jim Benson’s SpaceDev announced in the 1990s that it intended to begin commercial asteroid mining; however, nothing ultimately came of that endeavour.⁹⁶ Additionally, Fabio Tronchetti asserts that one of the main motivations for the drafting of the Moon Agreement was the concern about the imminent prospect of lunar mining; suffice it to say no mining of the Moon has yet occurred.⁹⁷

While it is easy to claim that the same has happened again, as both Planetary Resources and Deep Space Industries have been acquired by others and have, at the very least, shelved plans for asteroid mining⁹⁸ the Space Resource Exploration and Utilization Act of 2015 has changed the situation. It is no longer particularly relevant whether space resource activities are an imminently viable industry or on the cusp of initiating commercial resource activity operations. As there are now two States with national legislation addressing space resource activities, it is reasonable to expect others to follow. The US and Luxembourg laws are likely to serve as templates, in whole or in part, for other national legislation. Furthermore, there is potential for these laws to provoke the development of customary international law regarding space resource activities. Therefore, regardless of the actual viability of the embryonic space resource activities industry (which will be looked at in the next section) the legal regulation of

⁹⁴Mann, ‘Tech Billionaires Plan Audacious Mission to Mine Asteroids’ (n 71); ‘Planetary Resources’ (n 71); Pyle, ‘Deep Space Industries’ (n 71)

⁹⁵Pearson ‘Space Mining: the New Goldrush’ (n 72); Saletta and Orrman-Rossiter ‘All of Humanity Should Share in the Space Mining Boom’ (n 72)

⁹⁶Alpert, ‘Making Money in Space’ (n 56), 95; Tim Beardsley, ‘The Way to Go in Space’ (1999) 10 *Scientific American Presents* 59, 60-61; Ridenoure, ‘NEAP’ (n 56)

⁹⁷Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies* (n 9), 219

⁹⁸Foust, ‘The Asteroid Mining Bubble has Burst’ (n 78)

the industry does need to be discussed. Finally, iSpace,⁹⁹ among others continue to actively pursue Lunar resource activities and there are, and may yet be more to come, new entrants to the market, such as UK based Asteroid Mining Corporation,¹⁰⁰ who have the stepping stone of an embryonic legal framework which, at the very least, has provided a degree of legitimacy to the notion of ‘space mining’. While it is not yet a reality, it has moved, at least in part, out of the realm of science fiction.

2.3 Considerations of Economic Viability and Equity

This section examines the distribution of resources, based upon Martin Elvis’ body of work on the composition of asteroids. This section puts the ‘abundance’ of the solar system in context and demonstrates that while the sum total of material in the solar system is significant the currently accessible resources are more limited. This makes the necessity of a ‘property rights’ regime or some form of governance structure more of a necessity in order to avoid conflict over those ‘ore-bearing’ objects which are available.

As discussed above, there is an abundance of interesting and useful material in the solar system, from iron, platinum group metals or water, however, the distribution and accessibility of this material is less clear, especially when the economic viability of extraction is considered. One of the concerns about the developments of a ‘space resource activities’ framework is that it will be based, essentially, on a ‘first come first served’ basis which will, once again, disadvantage developing States as the ‘spacefaring’ States (i.e. the US, China, Japan, Luxembourg etc) will scoop up the lowest hanging fruit before the developing States have a chance to get in on the action. This will exacerbate the inequality between the rich States and the poor States. So far

⁹⁹Cornish ‘Interplanetary Players’ (n 89)

¹⁰⁰‘Scottish Firm Unveils Plans for Asteroid Mining Mission’ (BBC News, 30 July 2018)
<<https://www.bbc.co.uk/news/uk-scotland-scotland-business-45006938>> accessed 9 January 2020

those advocating for the 'space mining' industry (whether they be actively involved or merely advocates) have largely argued that as there is so much material available the latecomers have nothing to worry about. This is worth examining.

Ore, as used by the terrestrial mining industry, means commercial profitable material. "Ore is not simply a high concentration of some resource, but includes consideration of the cost of extraction of the resource and its price."¹⁰¹ Therefore when talking about the material wealth of the solar system it is not enough to simply talk about the vast quantities of material that is available in the totality of the system but the quantity of ore is what needs to be discussed. Now ore is obviously something of a fluid concept as what constitutes 'economically viable' will change based on technological development as well as the market price of the resource in question.

Martin Elvis claims that focus should be on NEOs because main belt are 'too hard to reach'. NEOs are primarily asteroids but there are comets among them. There are 20,000 NEOs larger than 100m diameter and over 10 million larger than 20m diameter. Elvis assessed NEOS for both platinum group metals and water. Elvis notes that the data available on NEOs and asteroids more generally is very limited. He assesses that the range of profitability based on the size of a PGM asteroid is quite vast, asteroids in excess of 100m diameter are most promising for PGM, smaller asteroids rapidly become unpromising targets¹⁰². "Good size and mass estimates are thus crucial to asteroid mining."¹⁰³

Elvis argues that 100m diameter seems like an 'optimistic' estimate for a profitability threshold, granted the costs of resource activity missions are yet unknown. And there are about 20,000 NEOs, however he estimates that the number of commercially viable

¹⁰¹Martin Elvis, 'How Many Ore-Bearing Asteroids?' (2014) 91 Planetary and Space Science 20, 20

¹⁰²*Ibid*, 20-23

¹⁰³*Ibid*, 23

(ore-bearing) NEOs (given costs of mission and getting to and from object etc) is only about 10 (assuming an outbound delta-v of 4.5km/s) though he stresses "that this number has large uncertainties and includes only metallic asteroids. Nonetheless, the number is surely smaller than would-be asteroid miners may have expected."¹⁰⁴

Elvis does note that if he allows for a slightly higher outbound delta-v assumption (5.5km/s) then the number of PGM ore-bearing NEOs would rise to about 100. "Water is often considered the first product likely to be mined from space. The water would be used in space either for life support or, separated into hydrogen and oxygen, for rocket fuel." Smaller NEOs are more viable targets for water miners than PGM. Elvis reckons that there are about 9000 water ore-bearing NEOs for outbound delta-v assumption of 4.5km/s and allowing for the same increase to 5.5km/s that would rise to about 90000. "Clearly improved surveys to find and characterize small NEOs would be extremely helpful in making the profitable mining of asteroidal water feasible." Elvis points out that there are also significant engineering questions that would force an adjustment of the assessment of what would constitute a profitable NEO. Elvis estimates that there are relatively few ore-bearing NEOs. Though water-ore-bearing NEOs will be more plentiful and easier to find. "Initial estimates give very low values for platinum group metals, larger, but still modest, numbers for water."¹⁰⁵

That said, understanding of distribution of material has improved due to various broadband sky surveys but our understanding of asteroid composition has not improved all that much. However, with the exception of the largest asteroids, spacecraft surveys will be the only way to determine composition of asteroids, and to date spacecraft have visited 12 asteroids. At least for MAB asteroids their 'parent'

¹⁰⁴*Ibid*, 23

¹⁰⁵*Ibid*, 23-26

body was probably hot enough to cause enough internal heating to give rise to differentiation which means that the remaining fragments (today's asteroids) will have different compositions (including metallic iron from the core).¹⁰⁶ As displayed in this section the 'abundance' of space resources is more complex than often presented. That complexity will generate a host of issues particularly as a potential driver of competition for access to resources. Further, this section highlights issues with determining the composition of asteroids and Near-Earth Objects which will be discussed again, when examining the definition of the term 'celestial body.' The next section, will discuss a 'sustainable' approach to development of space resources, taking a longer-term view of the issue than is the norm.

2.4 A Space Wilderness Reserve

There are further questions regarding distribution and quantity of resources in the solar system. Elvis and Milligan have raised the question of whether a portion of the solar system needs to be set aside as a 'wilderness'. Elvis and Milligan raise it as an economic sustainability argument, literally the issue that the resources under discussion are 'finite' and there is a point in which they will be exhausted and therefore if humanity is to avoid a catastrophic 'crash' there needs to be time to shift from an exponential growth model to a circular economic system. This section will look at the need for and ways to achieve 'sustainable' development of space resources. This is necessary for several reasons. First, as will be discussed, property rights are ultimately about distribution of resources, which requires a holistic approach. A 'property management regime' that does not take sustainability into account is not worth much. This section will also add weight to the argument that an international governance

¹⁰⁶N.E. Bowles, C. Snodgrass, A. Gibbings, J.P Sanchez, J.A. Arnold, P. Eccleston et al, 'CASTAway: An Asteroid Main Belt Tour and Survey' (2018) 62 *Advancements in Space Research* 1998, 2002, 2004-5

mechanism for space resources is necessary (albeit not legally required by the Outer Space Treaty) as a unilateral approach to space resources management is pointless in a multi-actor competitive domain; it takes all actors to prevent a ‘tragedy of the commons’.

“The Solar System is big. It is so big that the idea that humans may fully exploit and deplete its resources seems absurd. Yet if a true economy emerges in space it will start to make use of the vast yet finite resources of the Moon, Mars and small Solar System bodies (such as asteroids).”¹⁰⁷ They argue that it seems reasonable to expect that the off world economy will behave much as the terrestrial economy has done and therefore a growth rate of 3% seems a reasonable assumption, and such an assumption would see the economy grow to be 20 times larger at the end of a century. Such exponential growth “could lead to problems of resource depletion or exhaustion surprisingly soon.”¹⁰⁸

This will be an even greater problem than the resource crunch that presents itself as Earths resources are ‘used up’ as “once we have exploited our solar system, there is no other plausible and accessible new frontier.”¹⁰⁹ Elvis and Milligan refer to the “point where untapped resources cannot be readily be brought into use, as the point of ‘super-exploitation.’” They argue that approaching a point of super-exploitation is something that we should be concerned about because we should take into consideration the future generation of humans, especially those generations whose lives we can influence within a reasonable time frame. They argue that this is at a minimum within the next 500 years. Beyond that it becomes practically impossible to predict impacts. “Those who appeal to the future of humanity as a justification for

¹⁰⁷Martin Elvis and Tony Milligan ‘How much of the solar system should we leave as wilderness?’
<<https://arxiv.org/ftp/arxiv/papers/1905/1905.13681.pdf>>, 3

¹⁰⁸*Ibid*, 3

¹⁰⁹*Ibid*, 3

space exploration (or, indeed for any action whatsoever) should accept *at least* concern for future humans within this limited time-scale.” Elvis and Milligan argue for the adoption of a precautionary ‘one-eighth principle’ for the exploitable materials of the Solar System, specifically its solid bodies.¹¹⁰

Their one-eighth principle holds that

while economic growth remains exponential, we should regard as ours to use no more than one-eighth of the exploitable materials of the Solar System. And by ‘ours’ we mean humanity’s as a whole, rather than any particular generation of humans or group of generations. The remaining seven-eighths of the exploitable Solar System should be left as space wilderness.¹¹¹

Their growth rates apply to fresh materials, recycling will, of course, extend the timescales they are basing their assumptions on but as recycling will never be 100% effective it does not eliminate the problem altogether. Furthermore, their focus is on exploitable materials, they do not concern themselves with resources that may be excluded due to inaccessibility by say a gravity well (so elements found in Jupiter’s atmosphere, for example.)¹¹²

As a further qualification, if growth is *not* exponential, i.e. if we ever reach a stable-state economic system, without any danger of collapsing back into exponential growth, or if we develop some effective and *reliable* overall breaking-mechanism which would allow us to transition at any preferred time from exponential growth to a stable state system than the one-eight principle might reasonably be set aside.¹¹³

This principle is not to be taken as an argument against economic development and growth, their concern is not growth per se but rather unconstrained or runaway growth.

“The principle would, in fact, be redundant if there was some broader case against all economic growth.”¹¹⁴ Furthermore they recognize that certain locations may require

¹¹⁰*Ibid*, 3

¹¹¹*Ibid*, 4

¹¹²*Ibid*, 4

¹¹³*Ibid*, 4

¹¹⁴*Ibid*, 4

specific or stronger protections.¹¹⁵ This is an argument advanced by Newman, particularly with regards to the Moon.¹¹⁶ Elvis and Milligan, treat the solar system as a closed system given the negligible transfer of materials, furthermore they clarify that “the one-eighth principle refers specifically to ‘wilderness’ rather than, for example, ‘unused materials’, ‘territory’, or ‘pristine environments.’”¹¹⁷

As our primary concern here is the avoidance of resource depletion rather than the protection of the natural against human activity, we will draw only upon a ‘think’ concept of wilderness that excludes various sorts of human *use* but not all forms of human *impact*.¹¹⁸

They also stipulate that they are proposing that this seven-eighths reserve is applied to the totality of resources in the Solar System not any specific body. Estimates for future space economy are based on concept of exponential growth, the classic example of exponential growth is that of reproducing rabbits, 2 becomes 4 becomes 8 becomes 16 etc. Economic history suggests that exponential growth even of a relatively low level is a valid assumption. Pace is important, key is the ‘doubling time’ or the time it takes to double the size of the economy, the one-eighth principle was formulated on this basis as reaching the one-eighth point would indicate that exponential economic growth was reaching an unsustainable level and we would need to make a transition to a stable-state economy (requiring no further resource extraction) and have the time to do so. “We ought not to deliberately expand beyond the point at which a future generation of humans could (reliably and safely) carry out an emergency slow down.”¹¹⁹

¹¹⁵*Ibid*, 5

¹¹⁶Christopher J. Newman, ‘Seeking Tranquillity: Embedding Sustainability in Lunar Exploration Policy’ (2015) 33 Space Policy 29

¹¹⁷Elvis and Milligan ‘How much of the solar system should we leave as wilderness?’ (n 107), 5

¹¹⁸*Ibid*, 5

¹¹⁹*Ibid*, 7-9

In defence of their choice of one-eighth, especially against those who argue that they are ‘anti-development, they argue that “one eighth of the iron ore in the asteroid belt would still be more than a million times greater than all the known iron reserves on Earth.”¹²⁰ Furthermore they estimate “that even with the restriction imposed by the one-eighth principle, and setting aside the four larger asteroids, we could still build 2 million Earth-orbit-girdling rings from Main Belt iron. That should be enough to go on with...”¹²¹

A circular economy will help but it cannot be 100% efficient as fuel for example will be lost and material used to build habitats will be unrecyclable for practical reasons.

However, a transition will be necessary and

exponential growth removes the room for complacency in the face of the apparent security that vast solar system resources seem to offer. We may, instead, wonder whether the million times more plentiful resource in the asteroid belt is really going to be such a vast amount once our tendencies to expand and to consume are taken into account.¹²²

With an annual growth rate of 3.5% in 400 years there could be as few as 60 years before the exhaustion of space resources. This would “be even more serious than exhaustion of untapped Earth iron, given that we would have no larger body of accessible metals to which we could then look without venturing beyond the bounds of the solar system itself.”¹²³ This is why they argue that

The remaining seven-eighths of the solar system should be left as space wilderness. (In the thin sense that it should not be brought into regular economic use as a resource.) Failure to do so will mean that future generations will have insufficient ‘breaking distance’ after only a few centuries of exponentially growing economic activity/resource utilization. If unchecked, such growth will tend towards a point of superexploitation, i.e. a situation of resource depletion where new resources cannot readily be brought into use, even in an emergency situation. The dangers of superexploitation, for a space-faring

¹²⁰*Ibid*, 14

¹²¹*Ibid*, 15

¹²²*Ibid*, 15

¹²³*Ibid*, 16

civilization whose limits are set by the bounds of a single solar system, are too great to be set aside.¹²⁴

In making this argument Elvis and Milligan do not advance any particular ethical theory or argument, their argument is more based on the logic of self-preservation, and self-interest. Their notion of constructing a ‘space wilderness’ for the preservation of space resources is particularly relevant as one of the primary arguments for the use of space resources and the development of outer space for use by humans is to advance the future of humanity into the solar system or even beyond. It therefore seems to be illogical to set up a scenario where future human generations face a catastrophic resource ‘cliff edge’ that would spell doom for a human civilization in outer space. Furthermore, as is explored elsewhere, and hinted at by Elvis and Milligan there are alternative arrangements that would allow for ‘sustainable development’ of outer space.

There are other arguments for ‘embedding sustainability’ in the property rights regime for governance of space resource activities. Writing specifically with regards to the Moon but with arguments that are potentially applicable to other solar system bodies, Christopher Newman argues that there is a need to embed ‘sustainability’ in Lunar exploration policy. He argues that Moon is in fact poor target for commercial mining, asteroids far better, and the potential environmental damage from commercial lunar mining makes it undesirable.¹²⁵ Furthermore, consideration should be given to the purpose of ‘use’; not all ‘use’ is necessarily equal. As Newman argues “sustainable lunar development and scientific exploration of the Moon are undertakings that have fundamentally different goals to commercial, for-profit activities.”¹²⁶ Furthermore, and in conformity with the notion that there should perhaps be differing

¹²⁴*Ibid*, 17

¹²⁵Newman, ‘Seeking Tranquillity’ (n 116), 31-32

¹²⁶*Ibid*, 32

approaches to the differing celestial bodies, Newman states that “the assertion that commercial mining on the Moon is not worth the environmental impact it will cause does not mean that such a conclusion will follow for all other celestial bodies.”¹²⁷ Although as discussed there is nothing to support the notion that the space treaties themselves make any distinction between the various natural objects present in the solar system. However, Newman argues that

This conflation of the Moon with other celestial bodies has contaminated all debate and discussion regarding the legal status of the Moon. Policy makers and lawyers need to acknowledge that the Moon is separate from other celestial bodies, and the issues it faces are unique.¹²⁸

It is also worth considering the value of the resources under discussion versus the potential damage that extracting them may cause after all while lunar resources are substantial enough to support ISRU activities in support of operations “it is questionable whether lunar mining will ever provide a stream of easily accessible, valuable resources”¹²⁹ particularly as while the Moon’s gravity well is not substantial compared to a planetary gravity well it is still more energy intensive to deal with compared to a Near Earth Object.¹³⁰ Furthermore, “disassociating lunar property rights from other, more potentially economically attractive celestial bodies reflects this reality and disengages the Moon from this key area of discord.”¹³¹ Finally, Newman essentially argues that there should be a prohibition on mining the Moon, similar to Antarctica, he states that “the essence of sustainability in a lunar context entails recognition of the Moon as a unique celestial body with a delicate environment upon which commercial mining should not be under taken.”¹³² Whether under such a

¹²⁷*Ibid*, 32

¹²⁸*Ibid*, 35

¹²⁹*Ibid*, 35

¹³⁰Lewis, *Mining the Sky* (n 80), 7-8

¹³¹Newman, ‘Seeking Tranquillity’ (n 116), 35

¹³²*Ibid*, 36

scheme Lunar resources would be considered part of the seven-eighths of the ‘wilderness reserve’ proposed by Elvis and Milligan is doubtful as the point of their scheme is not the preservation of areas of the solar system but allowing a buffer to enable transformation of a ‘circular’ economy. An area excluded from use would therefore not contribute to the buffer.

2.5 Conclusion

As has been demonstrated, space resource activities (space mining) are a plausible industry which is in the process of being developed. Furthermore, States (such as the United States and Luxembourg) are taking this prospect seriously and have introduced legislation to regulate it. Therefore, space resource activities and the legal issues presented by it need to be taken seriously. Furthermore, it is imperative that the actual, physical distribution of resources is taken into consideration when devising any property rights regime or governance framework for space resource activities. Effective resource management is key for sustainability, which is necessary because while there is a considerable quantity of material available it is not infinite. Sustainability is, or should be, a key aspect of any property rights regime. Further, given the provisions of Article I OST planning needs to be undertaken to ensure future access to resources for those countries not yet ready to participate.

The primary contribution of this chapter is to provide a foundation regarding the nature of space resource activities, and the distribution, availability and accessibility of space resources. This provides an explanation for why a space resources property rights regime is necessary and an important context for particular considerations such as what is meant by ‘in the interests of all States.’

The next chapter will discuss the international legal context within which space law operates. It will discuss the nature of ‘space law’ as a ‘special regime’ and how ‘gaps’

should be ‘filled.’ It will also discuss the approach taken to the interpretation of treaties, particularly important given the centrality of the Outer Space Treaty to this enquiry, as well as the role of customary international law and the process for its creation and development.

Chapter Three: Public International Law

3.1 Introduction

As has been demonstrated in the previous chapter, space resource activities (space mining) are a plausible industry which is in the process of being developed. Furthermore, States (such as the United States and Luxembourg) are taking this prospect seriously and have introduced legislation to regulate it. Further, resource management issues, which will undoubtedly arise given the physical distribution of space resources, will need to be considered as part of any international governance structure, for the reasons discussed in the previous chapter. This chapter will focus on the framework of public international law within which any space governance regime operates.

The first section of this chapter touches upon the fact that space law is a ‘special regime’ (*lex specialis*) and what that means. This provides important context for discussing space law within the framework of international law. It is followed by a related discussion on the concept of ‘gaps’ and ‘silence’ in international law. Whether the lack of provisions for space resource activities in international space law constitutes a ‘gap’ or ‘silence’ matters because it has implications for whether there is a need for the ‘gap’ to be filled, perhaps by general international law, or whether there is simply no applicable law. The next section discusses treaty interpretation. Given the centrality of the Outer Space Treaty and a few other instruments, this is a vital discussion for the understanding of the approach taken in subsequent chapters and its grounding in international law. The subsequent section discusses customary international law and how it develops. This is important to the overall work because of the role that customary international law played and continues to play in the development of

international space law and undoubtedly will play in the development of law relating to space resource activities. Indeed, in a later chapter the developments in national law and at the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) are examined, in part, to determine whether these developments have made any impact on customary international law relating to space resources and it is argued that an *opinio juris* is beginning to crystallise. Finally, the last section discusses soft law, which plays a significant role in international space law and potentially provides a ‘solution’ to some of the governance issues raised by space resource activities. Arguably, with the efforts of The Hague International Space Resources Governance Working Group attempts to formulate ‘soft law’ on the topic of space resource activities have already commenced.

The objective of this chapter is to provide an understanding of the framework within which space law, and the discussions of the governance of space resource activities, operates. It makes the argument that while space law is a *lex specialis* it is not separate from general international law. It argues that the lack of provisions on space resource activities are not a ‘gap’ but a ‘silence.’ As well as that customary international law, has, is, and will play a role in the development of international law regarding space resource activities, as can be said of ‘soft law’. This will particularly be relevant with reference to an ‘international’ or ‘multilateral’ framework on space resource activities, which, as will be argued, does not necessarily have to take the form of a binding agreement.

3.2 Special Regimes

This section explains what is meant by ‘special regime’ and how they fit into the broader fabric of international law. Space law is a *lex specialis* or a ‘special regime’ which is law governing a specific matter. It is well established that ‘special regimes’

of international law do indeed exist, to quote Koskenniemi, “legal literature generally accepts the *lex specialis* as a valid general principle of law.”¹³³ While *lex specialis* are accepted they are also limited in application and only one factor in treaty interpretation.¹³⁴ Generality and speciality are relational:

A rule is never "general" or "special" in the abstract but in relation to some other rule. This relationality functions in two registers. A rule may be general or special in regard to its subject-matter or in regard to the number of actors whose behaviour is regulated by it.¹³⁵

Furthermore, “no special regime has ever been understood as independent from general law.”¹³⁶ There are no legal regimes outside of general international law, when the ‘special regimes’ rules ‘run out’ they fall back upon general international law.¹³⁷ Article III of the Outer Space Treaty makes this rather explicit with regards to space law stating that activities in outer space shall be conducted “in accordance with international law, including the Charter of the United Nations.” Therefore, while space law is a *lex specialis* it is still part of international law and so in the event of any ‘gaps’ in the body of space law recourse should be made to general public international law. This issue of ‘gaps’ or ‘silence’ on issues that arise in international law will be addressed in the next section.

3.3 Gaps and Silence

A question that needs addressing is whether the ‘absence’ of specific provisions in international space law on space resources activities constitutes a ‘gap’ in the body of space law. All legal systems have silence, or ‘gaps’, upon which the system “does not

¹³³Martti Koskenniemi, ‘Fragmentation of International Law’
<http://legal.un.org/ilc/sessions/55/pdfs/fragmentation_outline.pdf> accessed 9 January 2020, 5

¹³⁴*Ibid*, 5

¹³⁵*Ibid*, 5

¹³⁶Martti Koskenniemi, ‘The Fate of Public International Law: Between Technique and Politics’ (2007) 70 *The Modern Law Review* 1, 16

¹³⁷*Ibid*, 17

seem to speak.”¹³⁸ However, it is important to understand the nature of that ‘gap’ or ‘silence’ and what it means within the context of space law and international law more broadly. This section will look at the concept of ‘gaps’ and ‘silence’ in international law, how they arise, and what they mean, before looking at the specifics of whether the lack of specific provision for space resources in the corpus of space law constitutes either a ‘gap’ or a ‘silence’.

There is no clear direction in international law on what to do in case of silence or a ‘gap’. It is usually left to States or international courts to resolve, but there are many different approaches to silence. “One approach to silence is to assert that that which is not prohibited is legally permitted.” This approach is based on notion that international law is about limitations on State sovereignty and that States are free to act unless they have consented to be bound otherwise.¹³⁹

Quane argues that there are two approaches to take towards the sources of international law either they are a ‘snap shot’ at particular moment, or a ‘moving image’ that allows for evolving view. Quane argues that ‘moving image’ view is not only more useful but also probably more applicable, at least in international law.¹⁴⁰ That ‘gaps’ exist in international law is not disputed and well recognized in legal scholarship.¹⁴¹ However as Quane puts it, is the ‘gap’ a ‘gap’ or a ‘gap in the law’? A ‘gap in the law’ or *lacuna* “is the absence of something that arguably ought to be there.”¹⁴² This requires a broader, higher normative order to measure the gaps against.

There cannot be absence of norms *within* a normative order, because a normative order can consist only of norms. Only if a further normative order (natural law?) is superimposed upon the positive order can we classify *lacunae* as relating to ‘situations which this legal order *ought*

¹³⁸Quane, ‘Silence in International Law’ (n 64), 240

¹³⁹*Ibid*, 240-241

¹⁴⁰Quane, ‘Silence in International Law’ (n 64), 243

¹⁴¹Jorg Kammerhofer, ‘Gaps, The *Nuclear Weapons* Advisory Opinion and the Structure of International Legal Argument Between Theory and Practice’ (2009) 80 BYIL 333, 333

¹⁴²Quane, ‘Silence in International Law’ (n 64), 243

to govern'. We can refer to any behaviour that could be made the object of norms, and has not been made the object of norms, as gaps – and that means that any behaviour not so governed is a gap (like the sharpening of a pencil), yet it cannot be called a gap *within* the legal order.¹⁴³

Kammerhofer argues that legal scholars define gaps by way of their personal views of what the law should be. This is acceptable for natural law scholars as they operate within a higher ethical framework within which to identify 'missing' pieces of a broader normative order but for positive lawyers it is an unworkable solution.¹⁴⁴ From a legal perspective

nothing is missing. All other points of view, including moral, sociological, factual, political or natural-legal, are external to the legal view... This does not mean that the legal system is better than other norms, but it means that no normative order is by definition higher than any other and that Is and Ought are separate and do not directly create each other. Law is complete in itself, but not in relation to all possible forms of behaviour. Possible forms of behaviour might be a measuring-stick for the law, but it is not a measuring-stick on a strictly legal viewpoint.¹⁴⁵

"A further question is whether silence is intentional, inadvertent or simply a reflection of the international legal system's indifference to the conduct in question." Quane argues that there are several approaches to this – one view is that silence is not an intentional act. Therefore silence does not grant permission to act, rather it means the matter falls outside the scope of international law and "any permission to engage in that conduct is seen to flow from this factual state of affairs rather than any provision of international law." Another approach is to distinguish between inadvertent 'deficiencies' (*lacunes*) and times it is intentional or 'willed' (*insuffisances sociales*). In the latter, a court must declare a *non-liquet*.¹⁴⁶

By viewing international law as a moving image, it becomes more readily apparent whether silence is due to the matter being left

¹⁴³Kammerhofer, 'Gaps' (n 141), 339-340

¹⁴⁴*Ibid*, 355-356

¹⁴⁵*Ibid* 359

¹⁴⁶Quane, 'Silence in International Law' (n 64), 243-244

‘completely at large’ or whether the matter is in the process of being regulated albeit that such regulation has not yet crystallised.¹⁴⁷

Quane argues that it is also important to consider why international law is silent. If silence is because of the determination about the scope of international law, it may be appropriate to defer the matter to national law. She also argues that it matters whether international law is viewed as a system of permissions or prohibitions. There is no consensus on this point. The most common interpretation of *Lotus* is that of freedom of action in absence of prohibition. Quane argues that whether permissive principle exists rests on view of basis of international law. One approach, a positivist and voluntarist conception of international law, regards state sovereignty as the source of the international legal system. International law is only a limit on states’ freedom of action. In absence of clear prohibition states retain freedom to act. An alternative view is simply that “if there ‘is no law, there is no law.’” Freedom of action would therefore be derived from the factual absence of law and thus be open to non-state actors too.¹⁴⁸ This is the view taken by Kammerhofer.¹⁴⁹ He says that “States are not acting contrary to international law if they behave in a way international law does not regulate. ‘Gaps’ still cannot be closed absent positive norms that authorise someone to create law.”¹⁵⁰ Taking a positivist view means that the lack of provision for space resources in international space law is not a ‘gap’ but rather a silence. Then it is a question of whether it “is intentional, inadvertent or simply a reflection of the international legal system’s indifference to the conduct in question.”¹⁵¹ Looking at the *Travaux Préparatoires* indicates that this silence was not inadvertent, several delegates to the UNCOPUOS sessions which drafted the Outer Space Treaty raised the issue of space

¹⁴⁷*Ibid*), 244

¹⁴⁸*Ibid*, 245-258

¹⁴⁹Kammerhofer, ‘Gaps’ (n 141), 337

¹⁵⁰*Ibid*, 358

¹⁵¹Quane, ‘Silence in International Law’ (n 64), 243-244

resources,¹⁵² most notably the Japanese delegation.¹⁵³ However, there was a general agreement that it was premature to discuss space resources as well as a general desire to keep the OST to broad principles so that it could adapt to changing, future conditions.¹⁵⁴ So it could be argued that it was indifference that led to the silence in the outer space treaty but based on the *Travaux* it seems more appropriate to put it into Quane's intentional silence category. This can be further supported both by the rejection of the Japanese delegation's proposal to expand the 'harmful contamination' principle to include a duty to preserve and conserve the natural resources of celestial bodies¹⁵⁵, and Article 11 of the Moon Agreement, particularly given the rejection of that treaty by the international community. There was a choice *not* to include space resources or associated activities specifically within the corpus of space law. As mentioned, this was done as part of a broader effort to leave space law open to future developments. That said, space law is not entirely silent on the issue of space resources given the non-appropriation principle codified in Article II of the Outer Space Treaty. Finally, taking Quane's 'moving image' approach it is becoming clear that space resources fall into category of that which "is in the process of being regulated albeit that such regulation has not yet crystallised."¹⁵⁶ The next section will discuss the process of interpreting existing international law. The first part of this involves the interpretation of treaties followed by customary international law, which plays a part in resolving these silences and enabling the crystallisation of new regulations, at least where a new treaty has not been implemented.

¹⁵²A/AC.105/C.2/SR.63 (n 66), 8

¹⁵³A/AC.105/C.2/SR.68 (n 66), 6; UNCOPUOS 'Summary Record of the Seventy-First Meeting' (21 October 1966) UN DOC A/AC.105/C.2/SR.71, 13

¹⁵⁴A/AC.105/C.2/SR.61 (n 66), 8; A/AC.105/C.2/SR.63 (n 66), 11; A/AC.105/C.2/SR.68 (n 66), 10

¹⁵⁵A/AC.105/C.2/SR.71 (n 153), 13

¹⁵⁶Quane, 'Silence in International Law' (n 64), 244

3.4 VCLT and Treaty Interpretation

Treaty interpretation is a significant aspect of identifying ‘silence’ on a topic. The process of treaty interpretation is fairly established and codified in the Vienna Convention on the Law of Treaties (VCLT).¹⁵⁷ This section will examine the rules of treaty interpretation through the lens of the VCLT, as well as some of the established ‘approaches.’ It will make the case for the evolutionary approach with regards to the Outer Space Treaty.

The VCLT is a widely accepted treaty (116 parties and 45 signatories as of 19 July 2018)¹⁵⁸ and is also widely regarded as being reflective of customary norms.¹⁵⁹ Additionally, even though the United States is not a party to the Vienna Convention on the Law of Treaties the executive branch of the US government has stated that it regards it as “reflecting binding norms of customary international law” and the US courts have, on occasion, used the Vienna Convention on the Law of Treaties to assist in the interpretation of treaties, despite the US not being a party to it.¹⁶⁰ Furthermore, both Articles 31 and 32 are regarded as being reflective of customary international law and can and have been used to interpret treaties even where one of the parties is not a

¹⁵⁷Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980), 1155 UNTS 331 (VCLT)

¹⁵⁸United Nations, ‘Status of the Vienna Convention on the Law of Treaties as at 05-08-2015’ <https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXIII-1&chapter=23&Temp=mtdsg3&lang=en> accessed 20 July 2018

¹⁵⁹Jan Klabbers *International Law* (1st edn. CUP 2013), 41; James Crawford, *Brownlie’s Principles of Public International Law* (8th edn. OUP 2012), 367; Malgosia Fitzmaurice, ‘The Practical Working of the Law of Treaties’ (166-197) in Malcolm D. Evans eds., *International Law* (4th edn. OUP 2014), 167

¹⁶⁰Curtis A. Bradley, *International Law in the U.S. Legal System* (2nd edn. OUP 2015), 31-32

party to the VCLT.¹⁶¹ Also the ICJ stated in both *Pulau Ligitan/Sipadan*¹⁶² and *Kasikii/Sedudu Islands*¹⁶³ that the fact that Articles 31 and 32 are reflective of customary international law circumvents the non-retroactivity of the VCLT as set out in Article 4. In *Pulau Ligitan/Sipadan* the treaty that was being interpreted was from 1891, and in *Kasikii/Sedudu Islands* the treaty was from 1890, well before the VCLT came into force. Therefore, the interpretive procedure set out in Articles 31 and 32 VCLT can be used even on treaties that came into force before 27 January 1980, such as the Outer Space Treaty.

Articles 31, 32 and 33 VCLT deal specifically with the interpretation of a treaty. Article 31(1) of the Vienna Convention on the Law of Treaties declares that “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.”¹⁶⁴ This means that in the event that there is not a definition provided by the treaty itself, the first recourse should be to the ordinary, usual meaning given to a term. Article 32 of the Vienna Convention, says that if the meaning is still unclear, or the giving the ordinary meaning to the terms of the treaty leads to an absurd result then the preparatory work can be used to interpret the treaty. However, all of this need to be done with regard to the treaty as a whole, not just that specific term or article, and it needs to consider the context, and the object and purpose of the treaty. Article 33

¹⁶¹*Territorial Dispute (Libyan Arab Jamahiririya/Chad)* judgment, ICJ Reports 1994, p6, para 41; *Oil Platforms (Islamic Republic of Iran v United States of America)*, preliminary objections, judgment, ICJ Reports 1996, p 803, para 23; *Kasikii/Sedudu Islands (Botswana/Namibia)*, judgment, ICJ Reports 1999, p 1045, para 18; *Arbitral Award of 31 July 1989*, ICJ Reports 1991 p53, para 48; *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v Serbia and Montenegro)* Judgment, I.C.J. Reports 2007, p43, para 160; *Avena and other Mexican Nationals (Mexico v US)*, ICJ Reports 2004, p12, para 83; *Sovereignty over Pulau Ligitan and Pulau Sipadan (Indonesia/Malaysia)*, Judgment, I.C.J. Reports 2002, p.625, para 37

¹⁶²*Sovereignty over Pulau Ligitan* (n 161), p.625, para 37

¹⁶³*Kasikii/Sedudu Islands* (n 161), p 1045, para 18

¹⁶⁴VCLT (n 157), Article 31(1)

VCLT stipulates that where a treaty is drafted in multiple languages they shall be regarded as being ‘equally authentic’ and terms shall be regarded as having the same meaning in all official languages of the treaty.

The ordinary meaning of a treaty term needs to be understood in context with the rest of the treaty and in line with the ‘object and purpose’ of the treaty. However, it makes a good place to start,¹⁶⁵ especially as textual analysis takes precedence.¹⁶⁶ Hulme argues that the VCLT mandates that “the text *always* be considered when analysing the ordinary meaning of a treaty term.”¹⁶⁷ However, while the text is important, and should be the first place to search for the ordinary meaning of a term it

...is the starting point of an interpretation, but only if it is confirmed by investigating the context and object and purpose, and if on examining all other relevant matters (such as whether an absurd result follows from applying a literal interpretation) no contra-indication is found, is the ordinary meaning determinative.¹⁶⁸

Recourse can be made to dictionaries to find the ‘ordinary meaning’, even specialist dictionaries, and indeed the courts have done so.¹⁶⁹ The acceptability of this is such that in her separate opinion in *Whaling in the Antarctic* Judge Sebutinde criticised the ICJ for not using the dictionary definition as the basis for its reasoning and analysis. She argued that given that the *Oxford English Dictionary* definition of ‘scientific research’ provided a ‘workable definition’ this should have been adopted as the basis for “the Court’s reasoning and analysis.”¹⁷⁰ However, care must be used and as always the term must be interpreted in line with the rest of the Vienna rules. Furthermore,

¹⁶⁵Gardiner *Treaty Interpretation* (n 26), 181, 184-185

¹⁶⁶Max H. Hulme ‘Preambles in Treaty Interpretation’ (2016) 164 *University of Pennsylvania Law Review* 1281, 1297; Claire Brighton, ‘Unravelling Reasonableness: A Question of Treaty Interpretation’ (2014) 32 *Australian Year Book of International Law* 125, 125

¹⁶⁷Max H. Hulme ‘Preambles in Treaty Interpretation’ (2016) 164 *University of Pennsylvania Law Review* 1281, 1299

¹⁶⁸Gardiner *Treaty Interpretation* (n 26), 185

¹⁶⁹*Ibid*, 186-189

¹⁷⁰*Whaling in the Antarctic* (Australia v. Japan: New Zealand intervening), Judgment, I.C.J. Reports 2014, p. 226 - Separate Opinion of Judge Sebutinde (para 9, page 433)

even if the meaning of a term is clear it is still necessary to check it against the context and object and purpose.¹⁷¹ Additionally it is worth noting that “...consideration of the object and purpose and context of a provision may demonstrate that the meaning to be attributed to a term differs from its ordinary meaning...”¹⁷² Finally and on that note it is important to note that Article 31(4) VCLT states that ‘a special meaning shall be given to a term if it is established that the parties so intended.’¹⁷³ Richard Gardiner says that “the most obvious evidence of such an intention is inclusion of a definition article.”¹⁷⁴ Which is a feature distinctly absent from any of the space law treaties.

However, while the text of a treaty is important, future development can also inform the interpretation of treaties. As Gardiner says the VCLT gives ‘a prominent role’ to subsequent developments both in terms of agreements and practice with regards to interpretation.¹⁷⁵ Article 31(3)(a) says that “any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions” shall be taken into account along with the context. Article 31(3)(b) says that “any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation.” Subsequent agreements do not need to take the form of formal amendments or even treaties.¹⁷⁶ What constitutes ‘subsequent practice’ is less clear and can vary depending on the subject matter of the treaty in question. However, it includes executive, legislative and judicial acts of State parties.¹⁷⁷ As Gardiner has said there is a logic to this as “words are given meaning by action.”¹⁷⁸ He also argues that “treaties embody the common understanding of the

¹⁷¹Gardiner *Treaty Interpretation* (n 26), 186-189

¹⁷²Claire Brighton, ‘Unravelling Reasonableness: A Question of Treaty Interpretation’ (2014) 32 *Australian Year Book of International Law* 125, 132

¹⁷³VCLT (n 157), Article 31(4)

¹⁷⁴Gardiner *Treaty Interpretation* (n 26), 183

¹⁷⁵Gardiner *Treaty Interpretation* (n 26), 253

¹⁷⁶Crawford, *Brownlie’s Principles* (n 159), 382

¹⁷⁷Gardiner *Treaty Interpretation* (n 26), 255-257

¹⁷⁸*Ibid*, 253

parties to them. Hence concordant practice of the parties is best evidence of their correct interpretation.”¹⁷⁹ Legislation which implements treaties into national law may take an interpretive stance which can help to illuminate the interpretation of the State party but later legislation may also address specific points of interpretation which arise later¹⁸⁰ (as with the space resource legislation promulgated by the United States and Luxembourg.) There needs to be a degree of frequency and consistency to the subsequent practice, it is after all meant to be the “common understanding of the parties.”¹⁸¹ It is also important to note that “the process of interpretation through subsequent practice is legally distinct from modification, although the distinction is often rather fine.”¹⁸²

That said it is worth considering how treaties can evolve. Treaties, and international law, is not a static thing, it develops and evolves. Hence the existence of the evolutionary interpretation approach. However, this is not a separate means of interpretation, but it is based on ‘intentions of parties approach.’ Evolutionary interpretation recognizes that the meaning of the terms of a treaty can change over time. Evolution occurs without specific effort of the parties to bring about change by amendment. The terms of the treaty need to be able to embrace change of meaning, so they are structured so as to allow for the expansion of their coverage “to include new activities, scientific advances, technological development etc where these would not have been specifically conceived at the time the treaty was drawn up.” Gardiner suggests there are three elements that indicate the evolutionary approach may be appropriate 1) the use of language in the treaty is adapted to evolve such as the use of ‘generic’ terms 2) the treaty has a long or indefinite duration and 3) there was a

¹⁷⁹*Ibid*, 253

¹⁸⁰*Ibid*, 257

¹⁸¹*Ibid*, 256-257

¹⁸²Crawford, *Brownlie's Principles* (n 159),, 386

presumption or awareness of the parties that terms would evolve.¹⁸³ The Outer Space Treaty meets all three of these ‘criteria’. Additionally, as discussed, the drafters of the OST expressed an expectation that an evolutionary, developmental approach to space law would be taken, which is why they stick to general principles in the OST.¹⁸⁴ Treaty interpretation is a central aspect of understanding international law although it is not the only aspect, the next section will discuss customary international law. This section has examined the process for elucidating the meaning of treaty terms but also understanding how the ‘common understanding’ of the international community can develop over time and this can be identified through subsequent practice and agreements, such as national legislation. Part of the process of the ‘evolution’ of international law and the ‘common understanding’ of the international community is the development of customary international law, which is discussed in detail in the following section.

3.5 Customary International Law

Customary international law is an important source of international law. Space law has its origins in customary international law and has continued to be shaped by it. This section will discuss the nature of customary international law looking at its two core components, State practice and *opinio juris*. Then there is an examination of the role of General Assembly Resolutions and Treaties in the formation, identification, and codification of customary international law. It will also look at some of the criticism of customary international law, specifically from the ‘realist’ perspective and from the ‘developing world.’ It will then move on to discuss ‘modern custom’ which looks at some of the ongoing debates about the nature and development of customary

¹⁸³Gardiner *Treaty Interpretation* (n 26), 467-471

¹⁸⁴A/AC.105/C.2/SR.61 (n 66), 8; A/AC.105/C.2/SR.63 (n 66), 11; A/AC.105/C.2/SR.68 (n 66), 10

international law. In particular the continuing relevance (or growing irrelevance) of ‘state practice’ and ‘duration’ with a specific examination of ‘instant’ custom proposed by noted space lawyer, Bin Cheng as well as the alternate ‘Grotian Moment’ notion. This is followed by an examination of the concept of ‘soft law’ and the role it plays in the development of norms for space governance. The section then examines developments in customary international law relating to the development of space resource activities.

Customary international law is one of the sources of international law. Specifically, as laid out in the Statute of the ICJ “international custom, as evidence of a general practice accepted as law.”¹⁸⁵ Generally the view is that that customary international law is a practice that has been accepted over time to constitute a legal obligation. These two elements work together, it is not enough for the practice to exist, but it needs to be followed by States because they feel under a legal obligation to adhere to that practice. Generally, it is thought that the practice needs to have occurred for some time however neither the ICJ Statute nor any other document or provision actually specifies a timescale. There are those who have argued that custom can develop in a much shorter period of time. Bin Cheng, specifically discussing space law, argued that with sufficient support for the practice the development of a customary norm could be virtually ‘instant’. Scharrf takes a slightly different approach arguing that there are ‘Grotian moments’ of fundamental change in which the paradigm can change resulting in rapid, although specifically not instant, development of new customary international law. It is worth considering whether space mining and the associated space law developments that have occurred over the last few years have resulted in development

¹⁸⁵Statute of the International Court of Justice (adopted 26 June 1945, entered into force 24 October 1945) UKTS 67 (ICJ Statute), Article 38(1)(b)

of new customary international space law regarding space resources. This involves looking at the concept of customary international law itself, the notion of ‘instant’ custom as well as the ‘Grotian moment’ idea, but also the developments in space law relating to space mining and whether they fit into any of these paradigms but also the role of national legislation and policies in the development of customary international law.

As mentioned, customary international law is one of the sources of international law. Specifically, as laid out in the Statute of the ICJ “international custom, as evidence of a general practice accepted as law.”¹⁸⁶ Generally the view is that that customary international law is a practice that has been accepted over time to constitute a legal obligation. These two elements work together, it is not enough for the practice to exist but it needs to be followed by States because they feel under a legal obligation to adhere to that practice. Generally, it is thought that the practice needs to have occurred for some time however neither the ICJ Statute nor any other document or provision actually specifies a timescale. Determining when something has gone from merely ‘common practice’ to customary law is tricky. And as Hugh Thirlway, channelling John Finnis, notes there is a valid question as to how an authoritative rule can be created without anyone in authority actually creating it?¹⁸⁷

Customary international law applies to all states, unlike treaties, which only apply between the parties, however persistent objectors to the development of the customary norm can ‘opt out’, furthermore there are ‘special’ or ‘local’ rules of customary international law. Custom exists because states recognize a general pattern of behaviour and feel themselves under a legal obligation to adhere to it.¹⁸⁸ “Custom – as

¹⁸⁶*Ibid*, Article 38(1)(b)

¹⁸⁷Hugh Thirlway *The Sources of International Law* (OUP 2014), 54-55

¹⁸⁸*Ibid*, 55-56

distinct from treaty obligations or the application of inchoate ‘general principles of law’ – continues to dictate broad swathes of international legal obligation.”¹⁸⁹ Customary international law “has permeated many domains of public international law – not only particular doctrinal niches, but also the very architecture of the system.”¹⁹⁰ *Opinio juris* is central to the formation of customary international law, although as will be discussed below, there is debate as to just how central *opinio juris* is.¹⁹¹

3.5.1 State Practice

State practice does not garner the attention that *opinio juris* does in the academic literature, and there is a reasonable explanation for this. After all, State practice in and of itself does not constitute customary international law, the mental element of *opinio juris* is necessary to differentiate from the ‘custom’ of a non-obligated diplomatic nicety and the ‘customary international law’ which a State is legally obliged to adhere to. Furthermore, there is room for debate as to what exactly can and does constitute State practice however there is broad scope for consideration here and

State practice can be reflected in the acts of the judiciary, legislature, or executive branch of government. It comes in many forms, including: Diplomatic correspondence; declarations of government policy; the advice of government legal advisers; press statements, military manuals, votes and explanations of votes in international organizations; the comments of governments on draft texts produced by the ILC; national legislation, domestic court decisions; and pleadings before international tribunals.¹⁹²

Bederman suggests that Article 38 of the ICJ Statute gets the formulation the wrong way round; ‘general practice’ is evidence of custom i.e. States engage in the ‘general

¹⁸⁹David J. Bederman *Custom as a Source of Law* (CUP 2010), 136

¹⁹⁰*Ibid*, 137

¹⁹¹*Ibid*, 138

¹⁹²Michael P. Scharf ‘Accelerated Formation of Customary International Law’ (2014) 20 ILSA Journal of International and Comparative Law 305, 312

practice' because they feel bound by the customary norm.¹⁹³ This is why some scholars have argued that *opinio juris*, which will be discussed in the next section, is the key, potentially only, aspect of custom that matters.

3.5.2 *Opinio juris*

The existence of a state practice is, on its own, not sufficient for there to be a custom, States need to feel legally obliged. That mental element is often referred to as *opinio juris*. Thirlway suggests that *opinio juris* may be more important than state practice however "since the *opinio juris* is a state of mind, there is evident difficulty in attributing it to an entity such as a State; and it thus has to be deduced from the State's pronouncements and actions..."¹⁹⁴ Some even go further as say that *opinio juris* is essentially all that matters,¹⁹⁵ a line of argument which will be discussed in greater detail below.

Regardless, *opinio juris* is certainly of central importance given the centrality of consent to the international legal system.

The doctrine of consent generally teaches that the common consent of states voluntarily entering the international community gives international law its validity. States, and presumably other international actors, are said to be bound by international law because they have given their consent.¹⁹⁶

Regarding determining *opinio juris* "the most direct evidence is, of course, what States have in fact done, and what they themselves indicated as to their reasons for doing it – or not doing it."¹⁹⁷ Identifying *opinio juris* is challenging though but the United Nations can help. States regularly make statements on key issues in international law

¹⁹³Bederman *Custom as a Source of Law* (n 189), 142

¹⁹⁴Thirlway *The Sources of International Law* (n 187), 70

¹⁹⁵Bin Cheng, *Studies in International Space Law* (Clarendon Press 1997), 138

¹⁹⁶Bederman *Custom as a Source of Law* (n 189), 140

¹⁹⁷Thirlway *The Sources of International Law* (n 187), 58

and General Assembly Resolutions can provide evidence of the existence of customary international law.

3.5.3 General Assembly Resolutions

General Assembly Resolutions, and indeed the UN in general, have played an important role in the development of international law since 1945. It is a forum which allows States to discuss critical aspects of international governance and provides all States a platform to express their views. It is partly for this reason that General Assembly Resolutions can be evidence of *opinio juris*. Scharf suggests that the UN General Assembly has allowed the shift in focus from state practice to *opinio juris* as resolutions and the debates that their development generates provides written evidence of the thoughts of States.¹⁹⁸ Furthermore, the ICJ has expressed support for the normative value of General Assembly Resolutions in the *Nuclear Weapons* Advisory Opinion stating that

The Court notes that General Assembly resolutions, even if they are not binding, may sometimes have normative value. They can, in certain circumstances, provide evidence important for establishing the existence of a rule or the emergence of an *opinio juris*. To establish whether this is true of a given General Assembly resolution, it is necessary to look at its content and the conditions of its adoption; it is also necessary to see whether an *opinio juris* exists as to its normative character. Or a series of resolutions may show the gradual evolution of the *opinio juris* required for the establishment of a new rule.¹⁹⁹

However, Scharf argues that UNGA resolutions do not properly or clearly differentiate between *lex lata* (what the law is) and *lex ferenda* (what the law should be). Also states often vote for resolutions in the spirit of compromise or international goodwill knowing that they are not binding.²⁰⁰ He says that “often resolutions reflect *lex*

¹⁹⁸Scharf ‘Accelerated Formation of Customary International Law’(n 192), 312

¹⁹⁹*Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, I.C.J. Reports 1996, p. 226, para 70

²⁰⁰Michael P. Scharf *Customary International Law in Times of Fundamental Change: Recognizing Grotian Moments* (CUP 2013), 50-53

ferenda cloaked as *lex lata*.”²⁰¹ There is little support for the notion that General Assembly resolutions can give rise to a customary norm in and of themselves (this will be examined in greater detail in a later section). Bederman argues that

General Assembly resolutions, precisely because they are recommendations, lack the necessary *opinio juris* for custom. This is so even though states may repeatedly vote for a resolution and process their support for the legal rule it stands for.²⁰²

Helfer and Wuerth state that

Rather, it is widely agreed that General Assembly resolutions provide only evidence of CIL, with the weight of that evidence dependent upon factors such as voting patterns, express reference to custom in the text, and, most importantly, whether legal norms referred to in the resolution are subsequently reinforced by other indicia of state practice and *opinio juris*.²⁰³

However, Judge Cancado Trindade says that

Despite these distinct patterns of voting, in my view the UN General Assembly resolutions reviewed in the present dissenting opinion, taken altogether, are not at all deprived of their contribution to the conformation of *opinio juris* as to the formation of a customary international law obligation of nuclear denuclearization. After all, they are resolutions of the UN General Assembly itself (and not only of the large majority of UN Member States which voted in their favour); they are resolutions of the United Nations Organization itself, addressing a matter of common concern of humankind as a whole.²⁰⁴

Furthermore, Thirlway does suggest that it is potentially possible for the ‘crystallization’ of a customary norm to ‘coincide’ with a widely supported General Assembly Resolution²⁰⁵ which given that “State votes on U.N. General Assembly Resolutions can thus be both a form of State practice and a manifestation of the State’s subjective attitude about the existence of the rule in question”²⁰⁶ means that while the

²⁰¹*Ibid*, 68

²⁰²Bederman *Custom as a Source of Law* (n 189), 149

²⁰³Laurence R. Helfer and Ingrid B. Wuerth, ‘Customary International Law: An Instrument Choice Perspective’ (2016) 37 *Mich. J. Int’l L.* 563, 577

²⁰⁴*Obligations Concerning Negotiations Relating to Cessation of the Nuclear Arms Race And to Nuclear Disarmament (Marshall Islands v India)* (Dissenting Opinion of Judge Cancado Trindade) [2016] ICJ Report 321, para 85

²⁰⁵Thirlway *The Sources of International Law* (n 187), 81

²⁰⁶Scharf ‘Accelerated Formation of Customary International Law’ (n 192), 312-113

General Assembly Resolution itself does not ‘create’ the customary norm it does provide the evidence for the emergence of the customary norm which if not born at that moment at least finds explicit expression, which therefore may seem ‘instantaneous’,²⁰⁷ however

widespread and representative support for the resolution would at least have to be backed by consistent actual practice, limited though it might be, among those States ‘whose interests are specifically affected.’²⁰⁸

While General Assembly Resolutions may not create custom in and of themselves they are potentially evidence of *opinio juris* and/or state practice and possibly the moment of crystallization of a customary norm of international law which may appear to be ‘instantaneous’ although the norm, has in fact been gestating before that specific moment. Though beyond the formalities there are arguments for giving the outputs of the United Nations General Assembly more weight.

Every society requires collective procedures to establish rules that differentiate between permissible and impermissible behavior. The United Nations plays a central role in this essential rule making for international society – largely through the Security Council, General Assembly, and associated world conferences – but other mechanism in international society also create rules. Some treaties are made outside the UN system, and regional organizations make rules as well. The murky institution of customary international law, which is greatly affected by the behavior of powerful states, also plays a role.²⁰⁹

As Paul Kennedy says in his book *The Parliament of Man*, the United Nations General Assembly, while perhaps not the manifestation of the dreams of the internationalists of the 19th and 20th century who aspired to a ‘Parliament of Man’, is nevertheless

the only real forum for world opinion – or, better, the opinions of the world governments that we have. Its resolutions may lack full follow-up because it is a deliberative body with no power to make decisions binding on member states; but those pronouncements are often a good

²⁰⁷Thirlway *The Sources of International Law* (n 187), 66

²⁰⁸*Ibid*, 81

²⁰⁹Thomas G. Weiss, David P. Forsythe, Roger A. Coate and Kelly-Kate Pease *The United Nations and Changing World Politics* (7th edn. Westview Press 2014), 373

barometer of international opinion and in many quarters regarded as having more legitimacy than the Security Council itself.²¹⁰

General Assembly Resolutions play an important role in the development of international law. They are part of the process of developing customary international law and help identify *opinio juris*. Furthermore, the process through which they are produced provides a platform for a multitude of States to express their opinions on important matters of international governance. This has indeed been the case in the development of space law, which began in earnest with General Assembly Resolutions, most notably the ‘Declaration of Legal Principles’ governing activities in outer space (UNGA 1721).²¹¹ Particularly given the similarities between the ‘Declaration of Legal Principles’ and the Outer Space Treaty it is arguable that the Outer Space Treaty codified existing customary international law. This aspect of treaties will be discussed in the next section.

3.5.4 Treaties

Treaty provisions can codify existing custom, and in doing so, provide evidence for that custom, and treaty provisions can become customary norms, which is what will be examined in this section. However, it is important to bear in mind that even when treaties codify custom these remain two separate and distinct sources of legal obligation and “the enduring separation of these sources is particularly important for non-ratifying countries and for state parties that later withdraw from a treaty that embodies a customary rule.”²¹² Indeed, the ICJ made this point in *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America)* saying that

²¹⁰Paul Kennedy *The Parliament of Man: The United Nations and the Quest for World Government* (Penguin 2006), 275

²¹¹UNGA Res 1962 (13 December 1963) UN Doc A/RES/1962 (XVIII)

²¹²Helfer and Wuerth, ‘Customary International Law’ (n 203), 574-575

The fact that the above-mentioned principles, recognized as such, have been codified or embodied in multilateral conventions does not mean that they cease to exist and to apply as principles of customary law, even as regards countries that are parties to such conventions.²¹³

Some treaties, like the UN Convention on the Law of the Sea, exist, at least in part, to codify pre-existing customary international law. “Such treaties may then serve as evidence of the content of the customary norm...”²¹⁴ However, it is also possible for treaties to be reflective of customary international law without that necessarily being the explicit intention of the drafters. Furthermore, the treaty provision may be a slight variation or development upon the pre-existing customary norm. Additionally,

to the extent that treaties do articulate customary norms it is often because they reflect pre-existing norms of customary law, like *pacta sunt servanda*. The subsequent treaty does not render the pre-existing custom negotiated. To the contrary, the act of codification often changes the content of rule for the treaty but not for its customary law antecedent.²¹⁵

Treaties, especially ‘multilateral conventions’ can record and define rules of customary international law but it is also possible for them to help to develop new rules as a result. This is particularly true when such a convention has been ratified or acceded to by an “overwhelming majority of States.”²¹⁶ However, the ICJ does set a high bar for the development of treaty provisions into norms of customary international law, because they are therefore binding on all states regardless of whether they are parties to the treaty or not.

There is no doubt that this process is a perfectly possible one and does from time to time occur: it constitutes indeed one of the recognized methods by which new rules of customary international law may be formed. At the same time this result is not lightly to be regarded as having been attained.²¹⁷

²¹³*Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America)*, Jurisdiction and Admissibility, Judgment, I.C.J. Reports 1984, p. 392, para 73

²¹⁴Helfer and Wuerth, ‘Customary International Law’ (n 203), 577

²¹⁵*Ibid*, 578

²¹⁶ *Continental Shelf (Libyan Arab Jamahiriya/Malta)*, Judgment, I. C.J. Reports 1985, p. 13, para 27

²¹⁷*North Sea Continental Shelf*, Judgment, I.C.J. Reports 1969, p. 3, para 71

Furthermore, the nature of the provision is also relevant.

It would in the first place be necessary that the provision concerned should, at all events potentially, be of a fundamentally norm-creating character such as could be regarded as forming the basis of a general rule of law.²¹⁸

The fact that international law rules can exist in parallel within treaty law and customary international law “expands the reach of the rules to those States that have not yet ratified the treaty.”²¹⁹ Furthermore this means that “the customary international law status of the rules can apply to actions of the treaty parties that pre-dated the entry into force of the treaty.”²²⁰ Additionally, custom binds States that were not in existence when the custom came into force, regardless of how they feel about it upon the states creation, and withdrawal from custom is not possible once it has been formed, again unlike a treaty.²²¹ This has been used by the ICJ to apply the Vienna Convention on the Law of Treaties of 1969 to disputes arising as early as 1890 between countries that did not exist at the time.²²²

Treaties and customary international law are intertwined, as demonstrated in this section. This has particular importance for space resources given the virtual universal acceptance of the non-appropriation principle as customary international law which means that the ‘non-appropriation principle’ applies even to those States who are not party to the Outer Space Treaty or any who may withdraw from it, this assertion is even stronger if the ‘non-appropriation principle’ is an *ius cogens* as some have argued.²²³ However, there is a question as to whether it matters which States are party to a treaty or supportive of a particular norm being or not being customary

²¹⁸*Ibid*, p. 3, para 72

²¹⁹Scharf ‘Accelerated Formation of Customary International Law’ (n 192), 309

²²⁰*Ibid*, 309

²²¹*Ibid*, 309

²²²*Kasikii/Sedudu Islands* (n 161), p1045, para 18

²²³Steven Freeland and Ram Jakhu ‘Article II’ (n 14), 55, 63; Lee, *Law and Regulation of Commercial Mining* (n 10), 125-126

international law. This will be explored in the next section, as will the notion of how much time is required to establish CIL.

3.5.5 ‘Specifically Affected States’ and Time

This section will discuss the concept of ‘specifically affected States’ and the duration of practice required to form customary international law. This is particularly relevant for space law and space resource activities in particular as the number of States involved or whose nationals will be involved in space resource activities is likely to be limited for some time to come. Similarly, the novelty of these activities and indeed activities in outer space in general (‘only’ 60 years) potentially inhibit the formation of customary international law if a lengthy or numerous duration of practice is required. However, there is a view that State practice does not need to be of a particularly long duration nor does the *opinio juris* need to be backed by all States. In

North Sea Continental Case the ICJ said that:

With respect to the other elements usually regarded as necessary before a conventional rule can be considered to have become a general rule of international law, it might be that, even without the passage of any considerable period of time, a very widespread and representative participation in the convention might suffice of itself, provided it included that of States whose interests were specially affected.²²⁴

However, it would be necessary that

State practice, including that of States whose interests are specially affected, should have been both extensive and virtually uniform in the sense of the provision invoked: - and should moreover have occurred in such a way as to show a general recognition that a rule of law or legal obligation is involved.²²⁵

There is a logic to this as international law is based on the consent of states and if a majority or relevant portion of the international community of States ‘consented’ to the creation of a new customary norm there seems little reason why it could not arise

²²⁴*North Sea Continental Shelf* (n 217), para 73

²²⁵*Ibid*, para 74

in an accelerated timeframe. Furthermore, there is the also question of which States can contribute to the *opinio juris*. As Thirlway says this is a clearer proposition in cases like maritime delimitation. As in that example, landlocked states are hardly able to add to the body of state practice and if state practice is evidence of *opinio juris* they have little therefore to contribute to that aspect of the development of customary international law as they have no coastline. However, this is less clear in cases like nuclear weapons as non-nuclear states could potentially become nuclear states. Additionally, their lack of nuclear weapons does not necessarily translate into a belief that nuclear weapons are illegal.²²⁶ However, even if non-nuclear weapons States do generally hold a belief that nuclear weapons are illegal there is the potential for nuclear weapons States ('specially affected' States) to block the formation of a customary norm, as recognized by the ICJ

The emergence, as *lex lata*, of a customary rule specifically prohibiting the use of nuclear weapons as such is hampered by the continuing tensions between the nascent *opinio juris* on the one hand, and the still strong adherence to the practice of deterrence on the other.²²⁷

For this reason, and others, the concept of 'specifically affected States' draws criticism from some quarters, Goldsmith and Posner argue that this approach essentially means that the major powers and interested parties can engage in a 'highly selective survey'.²²⁸ Similarly, Chimni says that this concept of 'specially affected' States and 'representative samples' can be used to limit participation to powerful, developed Western nations.²²⁹ However in challenge to this idea Bederman argues that

this is not, however, a thinly disguised bid for great power mastery over the levers of CIL formation. Rather, it is a recognition that, in measuring compliance with a supposed custom, what matters are the usages of states that had the opportunity to engage in such a practice.²³⁰

²²⁶Thirlway *The Sources of International Law* (n 187), 60-62

²²⁷*Legality of the Threat or Use of Nuclear Weapons* (n 199), p. 226, para 73

²²⁸Jack L. Goldsmith and Eric A. Posner *The Limits of International Law* (OUP 2005), 24

²²⁹B.S. Chimni 'Customary International Law: A Third World Perspective' (2018) 112 AJIL 1, 22

²³⁰Bederman *Custom as a Source of Law* (n 189), 146

Pearce argues that

while it may be shown that power and customary law are intertwined, this does not mean that customary international law is somehow less viable as a source of law. Nor does it mean that it is somehow less credible in its own right as a source of law.²³¹

Though he goes on to say, perhaps less helpfully, that the ‘dominance’ of powerful states is hardly relegated to customary international law but is the reality throughout international law and relations.²³² Which, perhaps, underscores, rather than undermines, Chimni’s point.

However, there is broad agreement, and as shown, support for that agreement provided by case law of the International Court of Justice, that consistency is key, that ‘constant and uniform’ practice, rather than unanimous uniformity, is the primary measure. While there are valid arguments that this may be unfair to developing states unable to maintain legions of lawyers to monitor and potentially object to developments in customary international law, to require all States in the international system to partake in a practice and have the necessary *opinio juris* (and be able to furnish evidence of that *opinio*) would essentially fossilise customary international law by thwarting new developments. This is particularly true in areas such as outer space where there are numerous least developed states who have little interest in, or ability to take an interest in, the concerns of the United Nations Committee on the Peaceful Uses of Outer Space, especially regarding such topics as space resource utilization. Which renders even a requirement for unanimity of *opinio juris* untenable.

Exactly how much practice or *opinio juris* is required will depend on the activity in question, the more destabilizing or repugnant the activity the less will be required and

²³¹Jeremy Pearce, ‘Customary International Law - Not Merely Fiction or Myth’ [2003] Austl. Int’l L.J. 125, 128

²³²*Ibid*, 128

the opposite is also true.²³³ An excellent example of this is the expansion of the jurisdiction over the continental shelf, i.e. the Truman Declaration, “the speed with which the custom crystalized was striking.”²³⁴ This gives customary international law a greater degree of flexibility than other sources of international law and that makes it a source of great strength for international law.

It allows international legal actors to informally develop rules of behavior, without the necessity of resorting to more formal and difficult means of law-making (like treaties). Custom ‘tracks’ or follows the conduct of States, international institutions, transnational business organizations, religious and civic groups, individuals involved in international matters, and many other actors.²³⁵

This is vital given the complexity and demands of the international system, as is evidenced by developments in outer space. Given the proliferation of new and novel activities there needs to be a way for the development and adaptation of space law to allow reasonable accommodation of those activities within the framework of the Outer Space Treaty and the existing body of space law. This is necessary if the corpus of space law is to survive as if States (or their nationals) feel unduly stymied by the existing law then they are likely to circumvent the existing framework. This will lead to fragmentation or worse.

3.5.6 ‘Modern Custom’

There is a notion that there has developed a ‘modern’ customary international law. This ‘modern’ customary international law has a greater focus on *opinio juris* than the ‘traditional’ customary international law. As Bederman argues traditional customary international law is inductive and *opinio juris* distinguishes between legal and nonlegal obligations whereas “modern custom is derived by a *deductive* process...”

²³³Frederic L. Kirgis ‘Custom on a Sliding Scale’ (1987) 81 AJIL 146, 149

²³⁴Helfer and Wuerth, ‘Customary International Law’ (n 203), 585

²³⁵David J. Bederman, ‘Acquiescence, Objection and the Death of Customary International Law’, (2010) 21 Duke J. Comp. & Int’l L. 31, 41

this places the emphasis on *opinio juris* as opposed to state practice and depends on statements rather than actions. However, there is concern that ‘modern’ CIL therefore “lacks the legitimacy of state consent and could either be enlisted in the service of great power interests or advance norms that are not really founded in state practice at all.”²³⁶ Though Scharf argues that acts and statements should be given equal accord and stipulates that “the case law of international tribunals is replete with examples of verbal acts being treated as examples of practice.”²³⁷ He also argues that “verbal acts can count as either the objective or subjective element” and it is also possible for the same conduct to serve as both element, Therefore votes on UN General Assembly Resolutions can be both State practice and *opinio juris*. Furthermore, inaction or silence, particularly but not necessarily when a State would normally have been expected to lodge a protest can also constitute State practice.²³⁸ Scharf also provides a useful insight into the rationale for the shift in emphasis from ‘traditional’ to ‘modern’ customary international law.

Traditionally, jurists and scholars have put more emphasis on State conduct than on the subjective element. That is because a State’s conduct was traditionally easier to ascertain than the belief of a State. With the introduction of the U.N. and other bodies where multilateral diplomacy is conducted in the open, however, the situation has in fact reversed.²³⁹

Debates about the centrality and importance of *opinio juris* and the continued relevance and necessity of State practice abound. It seemingly depends on the activity in question, but also the context, some like Scharf argue that in moments of ‘fundamental change’ or what he calls a ‘Grotian moment’ new norms of customary international law develop more easily. Cheng argues that, primarily owing to the

²³⁶Bederman *Custom as a Source of Law* (n 189), 144-145

²³⁷Scharf ‘Accelerated Formation of Customary International Law’ (n 192), 312

²³⁸*Ibid*, 312-313

²³⁹Scharf ‘Accelerated Formation of Customary International Law’ (n 192), 312

potential of UN General Assembly Resolutions, *opinio juris* may be all that is needed to develop a new norm of customary international law. Frederic Kirgis, articulated a view of a ‘sliding scale.’

On the sliding scale, very frequent, consistent state practice establishes a customary rule without much (or any) affirmative showing of an *opinio juris*, so long as it is not negated by evidence of non-normative intent. As the frequency and consistency of the practice decline in any series of cases, a stronger showing of an *opinio juris* is required. At the other end of the scale, a clearly demonstrated *opinio juris* establishes a customary rule without much (or any) affirmative showing that governments are consistently behaving in accordance with the asserted rule.²⁴⁰

In addition to being more flexible and ‘faster’, ‘modern’ customary international law, by relying “more on the element of *opinio juris* than on state practice”, has “more of an ethical” orientation and can be more open to progressive ideas and elements, which perhaps explains why it has faced less resistance from the developing world.²⁴¹ This has relevance for discussion of space resource activities as, with perhaps the exception of the introduction of legislation in two jurisdictions, there have been no ‘State practice.’ As will be discussed in the next section, which will examine Bin Cheng’s notion of ‘instant custom’, the notion of focussing on *opinio juris* has been part of discussions of space law for several decades.

3.5.7 ‘Instant’ Custom

‘Instant’ custom is a notion proposed by space lawyer Bin Cheng. The basic proposition is that customary international law can develop ‘instantaneously’ as a result of General Assembly resolutions. For Cheng, the key in the formation of customary international law is the requirement that States regard something as being ‘legally binding’ otherwise known as *opinio juris*. He argues that for certain principles

²⁴⁰Kirgis ‘Custom on a Sliding Scale’ (n 233), 149

²⁴¹Chimni ‘Customary International Law’ (n 229), 36-37

particularly when expressed in General Assembly resolutions this can be virtually instantaneous and does not require state practice. Cheng argues that practice is evidence of *opinio juris*. It is *opinio juris* that is the key to, and the only necessary element of, the formation of customary international law. He says that “not only is it unnecessary that the usage should be prolonged, but there need also be no usage at all in the sense of repeated practice, provided that the *opinio juris* of the States concerned can be clearly established.” He argues that this is the case owing to the voluntary nature of international law, essentially given that States are their own law-makers then if there is a general *opinio juris* between them then there is no reason that a new rule of customary international law cannot be created without practice.²⁴²

Cheng argues that among other things, General Assembly resolutions can provide evidence of this general *opinio juris*. However, in order for a General Assembly resolution to have such an effect Cheng argues that there must have been the “necessary *opinio communis juris* among Members of the United Nations” and that the wording of the resolution must “unequivocally express this *opinio communis juris*.”²⁴³ Cheng points to GA Res 96(1) affirming the crime of genocide as one such resolution, pointing out that the later Genocide Convention assumes that genocide is already a crime and “merely provides for its ‘prevention and punishment.’”²⁴⁴

He says that “provided that the intention is expressed articulately and without ambiguity, there appears to be no reason why an Assembly resolution may not be used as a means for identifying the existence and contents of a new *opinio juris*.” However, as with all General Assembly resolutions (barring those dealing with UN constitutional affairs) even these ‘law-finding’ resolutions are “still without force, but

²⁴²Cheng, *Studies In International Space Law* (n 195), 138

²⁴³*Ibid*, 141

²⁴⁴Cheng, *Studies in International Space Law* (n 195), 141

provides strong evidence of the existence and contents of the rule of law it states...” Furthermore, Cheng argues that “there is no reason why a new *opinio juris* may not grow overnight between States so that a new rule of international customary law (or unwritten international law) comes into existence instantly. This shows that international law is a living law and explains how changes take place.”²⁴⁵

Cheng, like Scharf, uses the development of space law as a ‘case study.’ He primarily looks at GA Res 1962 as it is the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space but he also considers GA Res 1721. However, he says that GA Res 1721 made no “pretension to being binding” as it “merely ‘commends’ to the States ‘for their guidance’ certain principles’. Therefore, on the face of it GA Res 1721 would not be one of Cheng’s ‘law-finding’ resolutions. However, Cheng argues that the US and the Soviet Union did consider it to be binding due to the resolution having been adopted unanimously by the General Assembly as well as being “declaratory of international customary law.” Though Cheng concedes that “it is questionable, however, whether the above-mentioned view of the Soviet Union, which was expressed only once, can be treated as representative of its general attitude towards General Assembly resolutions.”²⁴⁶

It is also worth noting that consensus and unanimity were part of how the UN space committee operated ordinarily, which perhaps undermines claims that space resolutions adopted unanimously have some special significance (if indeed unanimity has any special significance anyway.) As early as the opening session the principle was that COPUOS and its subcommittees would operate by ‘consensus’ “but in fact, as it was stressed by almost all the delegates, the essential point was agreement

²⁴⁵*Ibid*, 147

²⁴⁶*Ibid*, 127

between the two space powers.”²⁴⁷ Furthermore, it is worth bearing in mind that the Soviets favoured a treaty over a GA Res as they felt that “General Assembly resolutions lacked binding force.”²⁴⁸

With regards to differences between GA Res 1962 and 1721 Cheng notes that

declarations do not constitute a separate legal category. A treaty may call itself a declaration and is no less binding for being so called. A General Assembly resolution which chooses to assume the name declaration is not thereby rendered legally more binding than any other recommendation.²⁴⁹

He also notes that “in law a world of difference exists between a legally binding instrument and one the observance of which depends wholly on the good will of the States concerned.”²⁵⁰ Art 18 of the UN Charter provides no special significance to resolutions that were adopted by more than the required two-thirds majority. “Legally and constitutionally, no special virtue attaches to a unanimous vote, even though politically it may be of significance.”²⁵¹ Furthermore, again indicating that there may be more to this notion politically than legally, Cheng notes that “experience has shown that unanimity between the two super-powers, which alone have effective space capabilities at present, is an essential condition of agreement on legal principles governing activities in space.”²⁵² While the end of the Cold War and the relative decline of the Russian Federation has somewhat changed this dynamic it is still true that the ‘spacefaring nations’ hold greater sway in the formation of the norms and rules governing the use of outer space, and the United States maintains and perhaps even has an even greater, outsized strength with regards to the rule making for outer space given their ‘dominance’ in outer space.

²⁴⁷*Ibid*, 128

²⁴⁸*Ibid*, 132

²⁴⁹*Ibid*, 133

²⁵⁰*Ibid*, 134

²⁵¹*Ibid*, 135-136

²⁵²*Ibid*, 148

3.5.8 ‘Grotian moment’

According to Michael Scharf the term ‘Grotian Moment’ was coined by Richard Falk in 1985²⁵³, but Scharf has significantly developed the concept in his work *Customary International Law in Times of Fundamental Change: Recognizing Grotian Moments*. The concept of ‘Grotian Moment’, named after the ‘father of international law’ Hugo Grotius, is a “term that denotes radical developments in which new rules and doctrines of customary international law emerge with unusual rapidity and acceptance.”²⁵⁴ The phrase ‘international constitutional moment’ has also been used to describe a similar concept, but Scharf argues that this better suits international organizations, whereas ‘Grotian Moment’ better describes the development of customary international law. Traditionally the development of customary international law, which is just as binding as treaty law, has been seen as a slow process which develops out of widespread State practice followed because States feel a sense of legal obligation (*opinio juris*). The general opinion that this process at least takes several decades.²⁵⁵ However, in the 1969 *North Sea Continental Shelf* cases the ICJ indicated that this could happen more rapidly.²⁵⁶

The ‘Grotian Moment’ concept recognizes that “rapidly developing customary international law may be necessary to keep up with the pace of developments.” However, the ‘Grotian Moments’ concept is not synonymous with ‘instant custom’ as it still requires practice and time just less than normal – ‘time of fundamental change’ is important here.²⁵⁷

The Grotian Moment concept is to be distinguished from the controversial notion of instant custom. Grotian Moments represent instances of rapid, as opposed to instantaneous, formation of customary

²⁵³Scharf *Customary International Law in Times of Fundamental Change* (n 200), 4

²⁵⁴*Ibid*, 1

²⁵⁵*Ibid*, 5-7

²⁵⁶*North Sea Continental Shelf* (n 217), para 73-74

²⁵⁷Scharf *Customary International Law in Times of Fundamental Change* (n 200), 8-9

international law. In addition to General Assembly resolutions and international court decisions, Grotian Moments require some underpinning of state practice, whereas advocates of the concept of instant custom argue that customary law can form in the absence of state practice.²⁵⁸

General agreement is that the requirements of Article 38 of the Statute of the ICJ comprise two elements, the objective and subjective element ie practice and *opinio juris*. State practice has tended to garner more attention, if for no other reason than it is easier to discern. Verbal and written acts have frequently been held to constitute state practice and inaction or silence, especially when a protest or objection would normally be expected have also been held to be state practice, the latter notably in *Lotus*. One way of looking at the development of customary international law is as a form of claim and response, i.e. a state makes a claim and the international community responds favourably or not.²⁵⁹

Custom pioneers (the first states to initiate a new practice) have no guarantee that their action will actually lead to the formation of a binding custom. The response may be a repudiation of the claim. In such case, the repudiation could constitute a vigorous reaffirmation of existing law, which is strengthened thereby. Or, the claim and repudiation could constitute a kind of standoff, which could slow the formation of new customary international law. The reaction of third states is also relevant. Out of this process of claim and response, and third party reaction, rules emerge, are strengthened or degraded, or are superseded.²⁶⁰

An alternative approach is “articulation” and “act”:

The articulation can either accompany the initial act... or it can be embodied in a treaty, draft instruments of the International Law Commission, or resolutions of the UN General Assembly. Acts that follow and are consistent with the articulation will crystallize the policy into a principle that takes on life as a rule of customary international law. In other words, once there is a consensus articulation that states ought to conform to a given rule of conduct, a legal custom can emerge when some level of spontaneous compliance with the rule is manifest.²⁶¹

²⁵⁸*Ibid*, 219

²⁵⁹*Ibid*, 33-36

²⁶⁰*Ibid*, 36

²⁶¹*Ibid*, 37

Many scholars believe that claim and response is a better model for the reality of customary development than articulation and act. Furthermore, Scharf argues that general practice does not require uniformity or consistency of application but broad similarity. Furthermore, it is also important which States undertake the practice as Scharf argues that there is a qualitative aspect to it. ‘States of significance’ carry more weight in determining general practice, see *Continental Shelf* cases and space law... “It may be enough that the practice be representative, so long as it includes states whose interests are specially affected.” He also argues that these types of states also have greater weight in objecting to the development of a customary principle.²⁶²

“The purpose of the subjective element (*opinio juris*) is to differentiate state actions that give rise to legal norms from actions that do not.” *Opinio juris* “is necessary because state practice is often capable of being interpreted in various ways.”²⁶³

Traditionally the process of customary development is regarded as a slow process requiring several decades of practice at least. “...if customary international law is in fact a product of claim and response (as characterized by Myers McDougal), by necessity there must be more than a single act and some time must elapse before a practice becomes habitual among states.”²⁶⁴

However, as Scharf notes “...there exists no agreed-upon general formula for identifying how many states are needed and how much time must transpire to generate a rule of customary international law.” Furthermore “though usually overlooked, context can be an important third ingredient that explains the sometimes-accelerated formation of customary international law.” Scharf argues that in certain contexts (i.e. ‘times of fundamental change’) there can be ‘paradigm shifts’ that give rise to new

²⁶²*Ibid*, 37-40

²⁶³*Ibid*, 47

²⁶⁴*Ibid*, 58

customary international law faster than would otherwise be the case, this still requires practice, and time, unlike ‘instant custom’ but a ‘Grotian Moment’ requires considerably less of each than would be the case for normal development of customary international law.²⁶⁵

Scharf points to three case studies in defence of the ‘Grotian moment’ concept. These are the Nuremberg tribunals, the Truman Declaration extending the continental shelf and the development of space law.

Scharf has argued in an international tribunal that the Nuremberg tribunals constituted ‘a Grotian moment’ and for that reason he argued that the Extraordinary Chambers in the Courts of Cambodia should allow the notion of “Joint Criminal Enterprise”; the court ultimately allowed “Joint Criminal Enterprise” to be used based on the Nuremberg precedent and the UN General Assembly’s endorsement of the Nuremberg Principles.²⁶⁶

“This General Assembly resolution [UNGA 95(I)] had all the attributes of a resolution entitled to great weight as a declaration of customary international law: it was labelled an ‘affirmation’ of legal principles; it dealt with inherently legal questions; it was adopted by a unanimous vote; and none of the members expressed the position that it was merely a political statement.”²⁶⁷

It is for this reason that Scharf states that “Nuremberg, then, constitutes a prototypical Grotian Moment.” Scharf argues that as the Nuremberg principles were universally adopted by the then members of the UN and there was limited state practice of limited duration the only way of explaining their passing into customary international law is via the concept of a Grotian Moment.²⁶⁸

“In sum, it was the paradigm-shifting nature of the Nuremberg precedent in response to atrocities of an unprecedented scale and the universal and unqualified endorsement of the Nuremberg Principles by

²⁶⁵*Ibid*, 58-62

²⁶⁶*Ibid*, 1-3

²⁶⁷*Ibid*, 65-66

²⁶⁸*Ibid*, 63-68

the nations of the world in 1946 that crystallized (at least the first two forms of) JCE [Joint Criminal Enterprise] into a mode of individual criminal liability under customary international law despite the initially limited number of cases reflecting state practice.”²⁶⁹

Scharf states that “...the Truman Proclamation has all the hallmarks of a legitimate Grotian Moment.”²⁷⁰ The Truman Proclamation gave rise to the modern concept of the continental shelf. The proclamation “asserted U.S. jurisdiction and control over the natural resources of the continental shelf contiguous to the United States.” The US only claimed the shelf and made clear that the waters above would retain their character as the high seas. It was carefully worded not to mention of sovereignty, limiting its focus to jurisdiction over resources. The State department did express concern about the unilateral nature of the proclamation.²⁷¹

In sum, the legal rationale was based on geological reality, technological developments, national security, economic necessity, conservation, and the efficacy of coastal state regulation. The United States recognized that it was acting as a legal pioneer, but it couched its justification in legal terms that would render the action easier to accept and replicate by other states. Thus, the legal advisor’s memo invited other governments to join the United States in the ‘practical application of the principles set forth above.’²⁷²

The continental shelf concept was accepted and recognized with considerable speed and led to a spate of unilateral state declarations and brought with it a notable absence of protests or objections from other states which “prompted renowned international legal scholar Sir Hersch Lauterpacht to conclude that the concept of the continental shelf had become virtually ‘instant’ customary international law.” By the time of the 1969 *North Sea Continental Shelf* case the ICJ confirmed that the continental shelf concept as articulated in the Truman Proclamation was enshrined in customary international law...” Scharf notes that “the International Court of Justice observed that

²⁶⁹*Ibid*, 85

²⁷⁰*Ibid*, 121

²⁷¹*Ibid*, 109-112

²⁷²*Ibid*, 114

customary norms can sometimes ripen quite rapidly, and that a short period is not a bar to finding the existence of a new rule of customary international law.”²⁷³

Space is a third example that Scharf gives of an area of law in which customary international law developed rapidly during a ‘Grotian moment.’ Space law is an example which goes with Scharf’s argument that ‘key’ States can have a great importance in the development of customary international law in such moments. Initially only the US and USSR were actively engaged in spaceflight but their activities ‘overflowed’ the territory of a number of states, none of whom objected. “Whatever the reason or their silence, their tacit acceptance quickly crystallized into a new set of customary international law rules.”²⁷⁴ These rules were laid out in UNGA Res 1962. Scharf notes that although “State practice was limited in the early years of space exploration, ICJ Judge Manfred Lachs concluded that ‘it is difficult to regard the 1963 Declaration as a mere recommendation: it was an instrument which has been accepted as law.’”²⁷⁵

UN GA Res 1962 was adopted unanimously and many states, most notably the US and USSR, considered it to be reflective of customary international law, though there were those, most notably France, who did not agree, this was eventually resolved by the Outer Space Treaty, a binding legal instrument. However,

it is difficult to ascertain the exact moment the various rules governing activities in outer space crystallized into customary international law because there was no authoritative judgment on point from the International Court of Justice or any other competent tribunal.²⁷⁶

Arguments can be made for the date of the conclusion of the OST or UNGA Res 1962. If OST is deemed codification of customary international law then its principles extend

²⁷³*Ibid*, 117-120

²⁷⁴*Ibid*, 127-128

²⁷⁵Scharf *Customary International Law in Times of Fundamental Change* (n 200), 123-124

²⁷⁶*Ibid*, 132-133

to all states. This was tested with the Bogotá Declaration, but majority of states rejected this on the basis that OST represents existing general customary international law.²⁷⁷

While some scholars have referred to the principles enshrined in the 1963 declaration and 1967 treaty as ‘instant’ customary international law, the reality is that the two instruments reflected principles that grew out of the claims and reactions of many states during the course of eighty-three spaceflights from 1957 to 1967. This state practice was not conducted ‘in a legal vacuum.’ While ten years is an extremely short period for the formation of customary international law in most fields, the example of space law fits comfortably within the Grotian Moment concept, validating its accelerated formation.²⁷⁸

Scharf argues that “the 1963 declaration was the first widespread clear indication of *opinio juris* relating to the law of outer space.” And similar to Cheng he recognizes the Declaration of Principles (UNGA 1962) is somewhat ‘special’ compared to other GA resolutions. It is labelled a ‘Declaration of Legal Principles’, it dealt with legal issues, was framed as a codification of customary international law at the time of its drafting, it uses ‘shall’ and ‘will’ rather than ‘should’ and was “adopted by a unanimous vote without any reservation.” Scharf argues that the 1963 space principles declaration is “an archetypal case of a Grotian Moment” as “despite the limited state practice and minimal times, states and scholars have concluded that sometime prior to or shortly after the adoption of the 1963 declaration, the fundamental principles of space law had ripened into customary international law.”²⁷⁹

However, a Grotian Moment does not need to lead to ‘instantly’ fully fledged customary law, it can develop after the ‘moment’²⁸⁰

....‘Grotian Moments’ are transformative developments that generate the unique conditions for accelerated formation of customary international law. In these circumstances, General Assembly

²⁷⁷*Ibid*, 133-135

²⁷⁸*Ibid*, 135-136

²⁷⁹*Ibid*, 136-137

²⁸⁰*Ibid*, 217

resolutions and judgments of international tribunals often play a heightened role in confirming the newly emergent rule...²⁸¹

Furthermore “...not every momentous technological, geo-political, or society change results in accelerated formation of customary international law – for like recrystallized gem stones, true Grotian Moments are both precious and relatively rare.”²⁸²

3.6 Soft Law

It is also worth considering so-called ‘soft law’ and the role it plays in the international system and the development of customary international law. Steven Freeland describes soft law as “written instruments that might purport to specify standards of conduct, but do not emanate from the traditional ‘sources’ of public international law.”²⁸³ There is also the notion of ‘legal soft law’ which includes soft obligations in treaties such as the requirement in Article I OST that space activities are carried out for the benefits and in the interests of all countries as verification, compliance with and even definition of this requirement is virtually impossible. Freeland argues that the omission of soft law instruments from Article 38 of the ICJ Statute “cannot be considered as an oversight, but rather as deliberate.” Soft law provides guidelines or aspirations but are not legally binding.²⁸⁴ However, “non-binding norms have complex and potentially large impact in the development of international law.” Non-binding instruments can provide evidence of *opinio juris* and the process of drafting and voting for “non-binding normative instruments may be considered a form of state practice.”²⁸⁵

²⁸¹*Ibid*, 212

²⁸²*Ibid*, 220

²⁸³Steven Freeland, ‘The Role of ‘Soft Law’ in Public International Law and its Relevance to the International Legal Regulation of Outer Space’ in Irmgard Marboe (eds), *Soft Law in Outer Space: The Function of Non-binding Norms in International Space Law* (Boehlau Verlag, 2012), 19

²⁸⁴*Ibid*, 19-22

²⁸⁵Dinah Shelton ‘Law, Non-Law and the Problem of ‘Soft Law’ in Dinah Shelton (eds) *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System* (OUP 2000), 1

Furthermore, soft law itself can “eventually become customary international law,” and may “even be declaratory of customary international law in certain circumstances. For soft law to become customary *opinion juris* needs to develop (and state practice also needs to be taken into consideration.) Also there needs to a consideration of the intentions of the drafters of the instrument; a soft law option may not have been a second-best option but the deliberate choice.”²⁸⁶

Soft law can also form the basis for the development of an international regime. Soft law is often best suited for technical guidelines, it reduces the need for compromise and can be more easily updated than hard law options.²⁸⁷ Aoki feels that the use of soft law to ‘fill in the gaps’ will continue and is to be welcomed.²⁸⁸ She says that

Soft law will continue to be the most appropriate type of rules in the fields where (i) only technical rules are needed; (ii) commercialisation and privatisation are concerned; (iii) the subject is not directly concerned with national security and (iv) other national interests (e.g., economic interests) are not of significant importance.²⁸⁹

Shelton perhaps goes a bit further arguing that “the term ‘soft *law*’ itself seems to contain a normative element leading to expectations of compliance.”²⁹⁰ She also says that

Recent inclusion of soft law commitments in hard law instruments suggests that both form and content are relevant to the sense of legal obligation. Some soft law instruments may have a specific normative content that is ‘harder’ than the soft commitments in treaties. Other non-binding instruments may never been intended to have normative effect, but are promotional, serving as a catalyst to further action.²⁹¹

²⁸⁶Freeland, ‘The Role of ‘Soft Law’’ (n 283), 26-28

²⁸⁷Setsuko Aoki, ‘The Function of ‘Soft Law’ in the Development of International Space Law’, in Irmgard Marboe (eds), *Soft Law in Outer Space: The Function of Non-binding Norms in International Space Law* (Boehlau Verlag, 2012), 66-73

²⁸⁸*Ibid*, 84

²⁸⁹*Ibid*, 84

²⁹⁰Shelton ‘Law, Non-Law and the Problem of ‘Soft Law’’ (n 285), 2

²⁹¹*Ibid*, 4

She also makes the argument that it is “it is not always clear where law ends and non-law begins, or to use the current terminology, where ‘soft’ law should be placed.”²⁹² This is something that concerns d’Aspremont who argues that the distinction between law and non-law is blurring, that the number of actors, particularly non-state actors, involved in the creation of international norms is growing and that there is growing acceptance (based on reality) that normative activity is increasingly taking place outside the traditional remit of international law and that this has made scholars of international law less concerned with the rules about the sources of international law. He argues that we need to preserve “formalism in the theory of the sources of international law for the sake of the ascertainment of international legal rules and the necessity to draw a line between law and non-law.”²⁹³ This is potentially particularly important concerning the moniker ‘soft law’ as “it is generally assumed that denominating something ‘law’ makes a difference in expectations of compliance and consequences of non-compliance.”²⁹⁴

However, while it can be hard to differentiate between hard and soft law instruments, and Shelton does argue that their ‘distinctive’ features really are starting to blur, she also argues that “it may have to be conceded that legal obligation is not as significant a factor in state behavior as some would think.” However, she also suggests that “a further possibility is that law remains important and states choose a soft law form for specific reasons related to the requirements of the problem being addressed and unrelated to the expectation of compliance.”²⁹⁵ However, law does not operate in a

²⁹²*Ibid*, 3

²⁹³Jean d’Aspremont *Formalism and the Sources of International Law: A Theory of the Ascertainment of Legal Rules* (OUP 2013), 1-5

²⁹⁴Shelton ‘Law, Non-Law and the Problem of ‘Soft Law’ (n 285), 9

²⁹⁵*Ibid*, 11

vacuum, which remains true for space law regardless of the nature of the environment in which the activities it regulates are conducted and

In the end, the international legal system appears to be a complex, dynamic web of interrelationships between hard and soft law, national and international regulation, and various institutions that seek to promote the rule of law. In this system, soft law is playing increasingly important and varied roles.²⁹⁶

3.7 Space resources and customary international law

This section will examine developments with regards to space mining since the passage of the US space mining law in 2015 and whether there have been any developments in customary international law as a result. These developments include US legislation, Luxembourg's space resources law, the work of The Hague Space Resources Governance Working Group and the discussions that have taken place during the Legal Subcommittee of UNCOPUOS, as well as recent efforts by the government of Luxembourg to establish agreements without interested states regarding some sort of multi- or bi-lateral framework regarding space resource activities. This is important for the general task of this task because there have potentially been subsequent developments to the treaties. Furthermore, an understanding of how to proceed in the future requires an understanding of the potentialities afforded by developments in customary international law.

National legislation can play a role in the development of customary international law. National laws like the space mining legislation produced by the United States and Luxembourg can be a form of State practice²⁹⁷ but it can be or can also be proof of *opinio juris*.²⁹⁸ Regarding determining *opinio juris* “the most direct evidence is, of course, what States have in fact done, and what they themselves indicated as to their

²⁹⁶*Ibid*, 18

²⁹⁷Scharf ‘Accelerated Formation of Customary International Law’ (n 192), 312

²⁹⁸Bederman *Custom as a Source of Law* (n 189), 150

reasons for doing it – or not doing it.”²⁹⁹ Though the act of one State or even two States cannot “serve in itself as sufficient evidence of a State practice for purposes of establishment of a custom.” However, “it might do so if coupled with the acceptance of a number of other States affected by the act.”³⁰⁰ Which as discussed in detail above is an issue, how many and which States ‘count’. This has always been a problem for space law specifically owing to the relatively small number of actors in space.³⁰¹ As Thirlway highlighted there is also the question of which States can contribute to the *opinio juris*. This is certainly clearer in cases like Maritime delimitation that, say, the opinions of landlocked states are not considered as they cannot have any practice as they have no coastline but less clear in cases like nuclear weapons as non-nuclear states could potentially become nuclear states also their lack of nuclear weapons does not necessarily translate into a belief that nuclear weapons are illegal.³⁰² Does customary international law relating to space mining need to involve ‘all’ spacefaring states (although what constitutes a spacefaring State, does that necessarily require launch capability, because if it does then that rules out Luxembourg)? What about those ‘non-spacefaring’ states whose economies are highly dependent upon resource extraction whose interests might be ‘specially affected’? Do they fit within Thirlway’s formulation that “what that practice must feature is the participation of States ‘whose interests are specially affected’, and it should be such as to show the existence of ‘general recognition’ that a rule of law is involved.”³⁰³ It is certain that the spacefaring states must be involved in the development of the rules, treaty based, customary, non-

²⁹⁹Thirlway *The Sources of International Law* (n 187), 58

³⁰⁰*Ibid*, 63-64

³⁰¹Brian D. Lepard, ‘The Legal Status of the 1996 Declaration on Space Benefits: Are its Norms Now Part of Customary International Law?’ in Irmgard Marboe (eds), *Soft Law in Outer Space: The Function of Non-binding Norms in International Space Law* (Boehlau Verlag 2012), 291-292

³⁰²Thirlway *The Sources of International Law* (n 187), 60-62

³⁰³*Ibid*, 65

binding or otherwise, for the regulation of activities in outer space³⁰⁴, what is not clear is the role the rest of the states of the international community plays.

However, while the persistent object rule allows for states to thwart the development of new customary international law “it would seem that... fortune favors those States that aggressively stake-out new rules and hope that other nations simply do not notice or fail to act in a timely or compelling manner.”³⁰⁵ This is the role that the United States and Luxembourg are currently taking, while they are framing their actions as permissive under international law (and that claim is examined in greater detail elsewhere) it is clearly a new development that they are championing. So, while they are not ‘trying to get away’ with something they are staking out new ground in space law. This is part of how a customary norm comes about. Of course, there is not a specific moment of genesis or even necessarily a specific process, rather it is more of a ‘marketplace of rules’ in which emerging norms compete which different countries promoting and attacking the differing norms and they eventually emerge out of this struggle as new norms.³⁰⁶ Luxembourg is more clearly doing this with their network of bilateral agreements.³⁰⁷ And there is a possibility that these agreements as well as

³⁰⁴Cheng, *Studies In International Space Law* (n 195), 148

³⁰⁵Bederman, ‘Acquiescence, Objection and the Death of Customary International Law’ (n 235), 34

³⁰⁶Bederman *Custom as a Source of Law* (n 189), 150-151

³⁰⁷‘United States and Luxembourg Sign Memorandum on Space Co-operation’ (*Luxembourg Space Agency* 10 May 2019) <<https://space-agency.public.lu/en/news-media/news/2019/united-states-memorandum.html>> accessed 9 January 2020; ‘Luxembourg and Belgium Join Forces to Develop the Exploration and Utilisation of Space Resources’ (*Luxembourg Space Agency* 23 January 2019) <<https://space-agency.public.lu/en/news-media/news/2019/the-grand-duchy-of-luxembourg-and-belgium-join-forces-to-develop-the-exploration-and-utilisation-of-space-resources.html>> accessed 9 January 2020; ‘UAE and Luxembourg Explore Opportunities for the Development of Joint Space Projects’ (*Luxembourg Space Agency* 5 December 2018) <<https://space-agency.public.lu/en/news-media/news/2018/uae-and-luxembourg-explore-opportunities-for-the-development-of-joint-space-projects.html>> accessed 9 January 2020; ‘Luxembourg and the Republic of Poland Agree to Cooperate on Space Activities’ (*Luxembourg Space Agency* 12 October 2018) <https://space-agency.public.lu/en/news-media/news/2018/Lux_Poland.html> accessed 9 January 2020; ‘Luxembourg and Czech Republic Sign MOU on Space Activities’ (*Luxembourg Space Agency* 10 October 2018) <https://space-agency.public.lu/en/news-media/news/2018/Lux_CzechRepublic.html> accessed 9 January 2020

the US and Luxembourg national legislation could fall under the subsequent practice in application of a treaty as laid out in Article 31(3)(b) of the VCLT.³⁰⁸

However, space mining has not happened yet. While there are those who argue that some of the samples that have been taken as part of exploration initiatives might constitute ‘state practice’ Tronchetti emphatically rejects this asserting that

It is simply not true that there is practice in the exploration and utilization of extraterrestrial resources, at least not in the form and context envisioned by the Act. Undoubtedly, through the 1960’s, 1970’s, the Soviet Union and the United States collected lunar samples and brought them back to Earth. However, in these occasions, only limited amount of samples were taken and the primary purpose to do so was to gather scientific information about the lunar soil and its composition. Instead, what it lays behind the Space Resource Exploration and Utilization Act is the removal of asteroid natural resources by non-governmental entities, on a large scale, and with the goal of making a profit out of them. There is no practice related to this kind of activities.³⁰⁹

This is a particularly salient point given that practice in and of itself does not create a customary norm, and there is no evidence that the *opinio juris* of the relevant States was that this provided a precedent for commercial space mining (and indeed in the case of the Soviet Union we can be fairly certain even without specific evidence that they certainly would not have thought that, especially as they tried to prevent any private activity in outer space during the drafting of the Outer Space Treaty.)³¹⁰

“International law is created by states”³¹¹ and “the environment in which customary international law operates changes constantly, this law needs to be flexible to be of use.” In order for customary international law and international law (and space law)

³⁰⁸VCLT (n 157), Article 31(3)(b)

³⁰⁹Tronchetti, ‘The Space Resource Exploration and Utilization Act’ (n 50), 8

³¹⁰UNCOPUOS, ‘Union of Soviet Socialist Republics: Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space’ (10 September 1962) UN Doc A/AC.105/L.2, principle 7 (page 2); Michael Gerhand ‘Article VI’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn. Carl Heymanns Verlag 2009), 105

³¹¹Jens David Ohlin *The Assault on International Law* (OUP 2015), 155

to endure it needs to be aligned with the interests and consent of States.³¹² There are plenty of people, particularly Americans who are willing to declare that “the international rules governing the use of Outer Space have also become outdated.”³¹³ Therefore there needs to be a mechanism for development, and that mechanism is customary international law, which, as has been shown can be developed by the enterprising acts of a few states through their national legislation, this can lead to a cascade of developments which can quite rapidly (perhaps to the point of seeming instantaneous) lead to the ‘crystallisation’ of a new norm of customary international law. Perhaps the best example of this is the expansion of the jurisdiction over the continental shelf, i.e. the Truman Declaration, “the speed with which the custom crystalized was striking.”³¹⁴

3.8 Conclusion

An understanding of the Public International Law framework within which space law operates is vitally necessary and provides an understanding of the basis for much of the work of this enquiry. Further, as this chapter has demonstrated, while space law can be categorized as a ‘special regime’ it is also part of general international law, not only is this the case for all ‘special regimes’ but it is made explicitly clear as the situation for space law by virtue of Article III of the Outer Space Treaty. Therefore, when space law ‘runs out’ it rests on general international law. However, that does not preclude the lack of provisions regarding a topic, such as space resources. Though, as this chapter has argued, such ‘lack of provision’ should not be regarded as a ‘gap’, which assumes a natural ‘completeness’ and is not appropriate in a positivist

³¹²Pearce, ‘Customary International Law’ (n 231), 127

³¹³Stewart Patrick, ‘The Unruled World: The Case for Good Enough Global Governance’ (2014) 93 Foreign Affairs 58, 69

³¹⁴Helfer and Wuerth, ‘Customary International Law’ (n 203), 585

framework but as a ‘silence.’ This silence was intentional, and leaves space law open to future developments (such as those we are seeing) on the topic of space resources. This chapter also considered the process of interpreting treaties, particularly important given the centrality of the Outer Space Treaty. It presented the rationale behind focusing on the ‘plain ordinary meaning’ of treaty terms and reliance on the ‘dictionary definition’ as at least an indicator of such a meaning. It also made the case for allowing future developments to influence interpretation and taking an evolutionary approach to interpreting the Outer Space Treaty. The OST meets the ‘three criteria’ for adopting the evolutionary approach as it has broad, and adaptable language, the treaty is of an indefinite duration and the parties intended it to be a framework which would facilitate future development as evidenced by the *travaux préparatoires*.

The chapter also presented Customary International Law as an important piece of the puzzle which provides a process for the evolution of international law. While who qualifies as a ‘specially affected state’ might be unclear in the context of outer space (theoretically all states could be spacefaring, unlike landlocked states which cannot become coastal states) that *opinio juris*, particularly when expressed at a forum like UNCOPUOS, can drive an accelerated development of new customary international law, particularly if there is State Practice to support it (such as national legislation) is reasonable given the framework of international law and its fundamental nature as a voluntary state led process. *Opinio juris* on space resources has not formed, however it is crystallising. Finally, the case was made that soft law provides a potentially useful avenue to creating a coordinating international framework which while not as robust as a ‘hard law’ approach would provide flexibility which given the embryotic nature of space resource activities is desirable.

The next chapter will focus on the specifics of space law, particularly examining Articles I and II, focusing on what constitutes ‘use’ and ‘appropriation.’ This is at the core of this enquiry. The chapter will argue that ‘use’ within the Outer Space Treaty, utilizing a ‘plain ordinary meaning’ of the term permits space resource activities albeit not without limitations. Article II OST does indeed present problems for property (although not unsurmountable as will be proved by later chapters), but that does not prohibit the activity itself. While Article 11 of the Moon Agreement is relevant and needs to be understood, given its low uptake it is largely side-lined from this enquiry, but it is examined in the next chapter.

Chapter Four: Space Law Treaties

4.1 Introduction

The previous chapter explored the public international law framework within which space law sits as a ‘special regime’. It set out the approach to treaty interpretation that will be undertaken in this chapter. This is predominately the framework set out by the Vienna Convention on the Law of Treaties, though as explained an evolutionary approach which takes account of developments will also be utilized with regards to the Outer Space Treaty, which will be the main focus of this chapter. It also discussed customary international law, how it is created, and its role in the development of international law, however that is of greater relevance in the next chapter.

Space law is unusually dominated by treaty, and one treaty in particular: the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, better known as the Outer Space Treaty (OST). There are other treaties, such as the Liability Convention³¹⁵ and the Moon Agreement but the Outer Space Treaty dominates. This is largely due to the centrality the Outer Space Treaty plays to the space law regime, the other four major treaties build upon the ‘framework’ of the Outer Space Treaty which has been called both the Magna Carta³¹⁶ and the constitution of space.³¹⁷ The near universal acceptance of the treaty and the fact that all space capable and spacefaring states are a party to the treaty add to its importance.³¹⁸ Therefore, the main focus of this chapter is the provisions of the Outer Space Treaty. The Outer Space Treaty is the foundation of

³¹⁵Convention on International Liability for Damage Caused by Space Objects (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187 (Liability Convention)

³¹⁶Lyall and Larsen, *Space Law* (n 18), 53

³¹⁷Pop, *Who Owns the Moon?* (n 5), 36

³¹⁸Lyall and Larsen, *Space Law* (n 18), 53, 467; A/AC.105/C.2/2019/CRP.3 (n 24)

the space law regime and therefore any enquiry into a space law related question must examine in detail the provisions of the Outer Space Treaty. While, of course, treaty terms must be examined in the context of the entire treaty it is not necessary to examine the entire treaty within this chapter. Therefore, several key articles are focused on. The preamble is of vital importance as a setter of the ‘object and purpose’ of the treaty providing key context for interpretation. Article I OST is one of the most important articles and lays out the ‘freedom of use’ principle which underpins the ‘right’ to conduct space resource activities. It is necessary to examine whether or not ‘use’ as used in Article I OST does indeed permit space resource activities (this chapter will argue that it does.) In order to fully answer this question it is therefore necessary to look at Article II OST and the ‘non-appropriation’ principle which while one of the most important principles of space law is also the biggest potential barriers to space resource activities. Article III is briefly discussed; its importance is connecting space law to the wider body of international law. Article VI is the next to be discussed as the article which makes States responsible for the activities of their nationals in outer space it is the vital component of the space governance regime as it brings non-state actors under the umbrella of space law. Article VII is relevant to the question of jurisdiction in outer space. The next section examines the Moon Agreement, specifically Article 11. While the Moon Agreement has a limited number of parties it is a valid treaty. Furthermore, as Article 11 is the only part of space law to specifically address the question of resources it is necessary to examine it in further detail. Finally, the chapter examines the resource provisions of UNCLOS. While, the Law of the Sea Convention of course does not apply to outer space, UNCLOS and the Moon Agreement were negotiated concurrently and the International Seabed Authority

provides a potential model regime for space resources, under or independent of the Moon Agreement.

This chapter does not examine the Rescue Agreement, the Liability Convention, nor the Registration Convention as while they are important parts of international space law their application to this enquiry is limited. Furthermore, they build on principles laid out in the Outer Space Treaty, the key aspects of which (with the exception of Article V OST, the origins of the Rescue Agreement) are examined in this chapter.

The objective of this chapter is to examine the key aspects of the Outer Space Treaty, and Article 11 of the Moon Agreement, within the context of space resource activities. It looks directly at the space law on space resources, questioning the definition of ‘use’ in Article I of the Outer Space Treaty and ‘non-appropriation’ within Article II OST, and making the case that whatever issues there maybe regarding property, space resource activities are permitted under the Outer Space Treaty.

4.2 The Outer Space Treaty

As mentioned, the Outer Space Treaty is the foundational treaty for space law, however as not all of the treaty is relevant to the questions at hand the below will focus on the preamble, Articles I-III, VI and VIII. Finally, consideration of the ‘failed’ Moon Agreement will be given, especially the provisions of Article 11, as, despite the low uptake of the treaty it is not only a valid and active treaty which is binding on those states which are parties to it but it is also of considerable relevance to the question of the governance of space resource activities and property rights in outer space. This section will examine the relevant articles of the Outer Space Treaty within the context of space resources.

4.2.1 The Preamble

According to Article 31 VCLT the meaning of a treaty must be derived from the treaty in its entirety which includes the preamble.³¹⁹ The preamble sets out the reason for and general theme of the treaty. It is an important provider of context for the interpretation of the treaty as a whole. As Max Hulme has written “...the VCLT defines – almost in passing – the preamble as *part* of the text, the main focus of its interpretive approach, and an obligatory factor in the text-and-context analysis.”³²⁰ Further what Hulme classes the ‘object-and purpose approach to treaty preambles’ has been adopted in practice by ‘virtually all’ those engaged in treaty interpretation including, notably, international tribunals.³²¹ Hulme argues that

The preamble is a *mandatory* factor in interpretation, although the effect of this command will, of course, depend on the content of the particular preamble being examined. In other words, the text-and-context approach primarily seeks to ensure that preambles will be given the *appropriate* interpretive weight in light of their drafting, which requires that they be examined in the first place.³²²

The Outer Space Treaty’s preamble has several aspects that are worth noting, these include the references to the common interest of all humanity and the desire that the exploration of space be carried out for the benefit of all peoples. As well as calling for space to be explored and used for peaceful purposes and in furtherance of friendly relations and international cooperation. The preamble discusses the ‘great prospects’ provided by humanity’s “entry into outer space” as well as the value of the use of outer space for “all mankind.” These are themes which are repeated and further developed in the body of the treaty. The preamble indicates that part of the ‘object and purpose’

³¹⁹VCLT (n 157), Article 31, 2; Crawford, *Brownlie’s Principles* (n 159), 380-381

³²⁰Max H. Hulme ‘Preambles in Treaty Interpretation’ (2016) 164 *University of Pennsylvania Law Review* 1281, 1298

³²¹*Ibid*, 1300-1301

³²²*Ibid*, 1304

of the Outer Space Treaty is the facilitation of the use of outer space and humanity's future in space.

4.2.2 Article I

Article I is one of the most important provisions of the Outer Space Treaty and arguably in space law in general. It works in conjunction with Article II, which will be discussed specifically below. These two articles establish space as part of the 'global commons' and demonstrate the *res communis omnium* status of outer space and celestial bodies.³²³

Article I OST has several aspects to it. The overarching declaration of the article is the freedom of exploration and use of outer space. Additionally, it declares that "there shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies..." It also stipulates that the exploration and use of outer space "shall be carried out for the benefit and in the interests of all countries..." and "shall be the province of all mankind." Further, it states that "there shall be free access to all areas of celestial bodies." The treaty does not provide a definition of either the terms 'exploration' or 'use' nor an explanation of what is meant by the phrase 'province of all mankind.' These will be examined in turn.

Exploration is an uncontroversial term in space law, as Tronchetti writes it "did not generate any particular debate. It refers to discovery activities of the space environment for scientific reasons."³²⁴ Exploration of outer space is what Apollo 11, *Cassini*, *Hayabusa* and *Rosetta* did. That said, within the context of discussing space resource activities it is important to note that the terrestrial mining industry, has a different interpretation of the term exploration. It has a definitive purpose, to locate

³²³UNCOPUOS 'Summary Record of the Sixty-Fourth Meeting' (24 October 1966) UN DOC A/AC.105/C.2/SR.64, 3

³²⁴Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies* (n 9), 22

commercially viable deposits of minerals or ore. The mining industry use exploration as a synonym for prospecting; it is the stage before extractive operations commence.³²⁵ It is unlikely that this other, more commercial, more utilitarian definition would fit within the term ‘exploration’ as used in Article I of the Outer Space Treaty, it must be recalled that the standard rules of interpretation as expressed by the VCLT stipulates giving terms their ordinary meaning within the context of the object and purpose of the treaty and specialist definitions are only to be applied if specified.³²⁶ ‘Exploration’ as used by the mining industry would better fit under the ‘freedom of use’ as will be explained. Further, it is worth noting that The Hague International Space Resources Governance Working Group did not make use of the term ‘exploration’, opting instead to use ‘search for’, which they subsumed under the overarching term ‘space resource activity’.³²⁷ That this is meant to cover specialised terms like ‘prospecting’ or ‘exploration’ as used by the mining industry or even UNCLOS is made clear in the Commentary.³²⁸ Therefore, ‘exploration’ as used in Article I OST should be defined as a freedom of ‘investigation’³²⁹ and as Hobe says both exploration and scientific investigation “are to be distinguished from the actual use of outer space.”³³⁰

The second freedom laid out in Article I OST is the freedom to use outer space, the Moon and other celestial bodies. No clear definition of use is provided by the treaty itself and it is not immediately clear whether ‘commercial operations’ can fit within it. Several delegates to UNCOPUOS involved in the drafting of the Outer Space Treaty

³²⁵Paul W. Thrush and the Staff of the Bureau of Mines, eds., *A Dictionary of Mining, Mineral, and Related Terms* (US Department of the Interior 1968), 401

³²⁶VCLT (n 157), Article 31

³²⁷The Hague Working Group Building Blocks (n 61), Building Block 2.3

³²⁸*Commentary of the Building Blocks for the Development of An International Framework for the Governance of Space Resource Activities* (pre-publication), 16-19

³²⁹*Concise OED* (n 58), 502

³³⁰Stephan Hobe ‘Article 1’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag 2009), 35

did raise the issue that the definition of ‘use’ was unclear³³¹, the French delegate specifically queried whether ‘use’ included ‘exploitation’ or whether ‘use’ was simply limited to ‘use for exploration purposes’. In the course of this statement the French delegate observed that that the extraction of minerals on the Moon or other celestial bodies was hard to conceive at any point in the near future.³³² There was a general sense that the Outer Space Treaty should not be too prescriptive and that therefore terms like ‘use’ should be left open to allow scope for future development.³³³ It is also worth bearing in mind that the Soviets had initially attempted to restrict activity in space to only State activities however they eventually conceded and a compromise was reached permitting non-state activities which resulted in Article VI of the Outer Space Treaty.³³⁴ The *travaux préparatoires* clearly supports a broad interpretation of the term ‘use’ as found in Article I, and a definition which would include commercial operations. That said, according to Article 32 VCLT³³⁵, *travaux préparatoires* are only a supplementary means of interpretation, first recourse should be to the ‘ordinary meaning’.³³⁶

The question of whether or not use as used in Article One of the Outer Space Treaty includes commercial operations is actually a fairly straightforward one. The ‘ordinary meaning’ of ‘use’ is fairly broad and would certainly encompass commercial activity.³³⁷ Further examination of ‘subsequent practice’³³⁸ also provides ample support for the inclusion of the commercial operations within the scope of ‘use’.

³³¹UNCOPUOS 'Summary Record of the Fifty-Eighth Meeting' (20 October 1966) UN DOC A/AC.105/C.2/SR.58, 3; A/AC.105/C.2/SR.63 (n 66), 8

³³²A/AC.105/C.2/SR.63 (n 66), 8

³³³A/AC.105/C.2/SR.61 (n 66), 8; A/AC.105/C.2/SR.63 (n 66), 8, 11; A/AC.105/C.2/SR.68 (n 66), 10

³³⁴UNCOPUOS 'Summary Record of the Sixty-Seventh Meeting' (21 October 1966) UN DOC A/AC.105/C.2/SR.67, 3

³³⁵VCLT (n 157), Art 32

³³⁶*Ibid*, Art 31

³³⁷*Concise OED* (n 58), 1593

³³⁸VCLT (n 157), Art 31, 3(b)

Commercial operations are conducted in space on a daily basis, thousands of times an hour even and have been conducted since AT&T's *Telstar* satellite in the early 1960s. Commercial space activities range from everything as simple as enabling international communications to the sale of satellites themselves and even includes tourism, albeit in a limited form to date. This has all been conducted without objection from the international community. Commercial use of space has clearly achieved the status of a customary principle by meeting the requirements of frequency and duration of practice. Scholars of space law also support the inclusion of commercial activity within the scope of the freedom of use. Fabio Tronchetti has written that "the word 'use' can be interpreted to encompass both non-economic and economic use."³³⁹ Others have articulated that the freedoms laid out in Article I OST were intended to be as broad as possible.³⁴⁰

However, mining or resource extraction is potentially another matter. Lyall and Larsen raised the issue that exploitation, particularly if it involves permanent appropriation of materials, could have trouble fitting within Article I given the prohibition on national appropriation in Article II of the Outer Space Treaty.³⁴¹ Tronchetti has said that there is no clear internationally accepted rules governing the extraction of natural resources in space and that the controversy is not over scientific extraction but commercial extraction.³⁴² However, Hobe, in the *Cologne Commentary* supports the inclusion of commercial resource extraction within the definition of 'use' saying "the freedom of use contains the possibility for any entity to utilise outer space and its resources as well as the resources of the celestial bodies, be it for commercial or non-commercial

³³⁹Tronchetti, 'The Space Resource Exploration and Utilization Act' (n 50), 7

³⁴⁰Jakhu, et al, *Space Mining and its Regulation* (n 12), 118; Carl Q. Christol *Space Law: Past, Present, and Future* (Kluwer Law and Taxation Publishers 1991), 68-69; Hobe 'Article 1' (n 330), 30-35

³⁴¹Lyall and Larsen, *Space Law* (n 18), 186

³⁴²Tronchetti, 'Legal Aspects of Space Resource Utilization' (n 16), 788-789

ends.”³⁴³ Virgiliu Pop has argued that “any use is allowed, provided it is exclusively for peaceful purposes and does not harmfully contaminate the celestial body.”³⁴⁴

Gennady M. Danilenko has also written that “the Outer Space Treaty proclaims freedom in the use of outer space, which, as generally recognized, includes the freedom to exploit its resources.”³⁴⁵

To follow through on the standard procedure for interpretation it is useful to take a closer look at the ‘ordinary meaning’ of the term ‘use’. The *Concise Oxford English Dictionary* defines ‘use’ as, among other things, ‘1. take, hold, deploy as a means of achieving something 2. take or consume (an amount) from a limited supply.’³⁴⁶ This would clearly permit resource extraction. Further, the object and purpose of the Outer Space Treaty, as discussed is to facilitate humanity’s “entry into outer space” as well as promoting the development of its economic potential (there can be no value or benefit without development.) Additionally, looking at the *Travaux Préparatoires* it is clear that ‘use’ is intended to be broad and include ‘exploitation’.³⁴⁷ Further, the Japanese delegation proposed strengthening the ‘environmental’ provisions of what is now Article IX to ensure the “preservation and conservation of the natural resources... of celestial bodies” however this was rejected.³⁴⁸ Further, we now have, as a result of the legislation of the United States³⁴⁹ and Luxembourg³⁵⁰ as well as several years of discussion at the Legal Subcommittee of UNCOPUOS ‘subsequent practice’ which establishes that space resource extraction falls within the freedom of use in Article I of the Outer Space Treaty. However, that freedom is not unlimited or without

³⁴³Hobe ‘Article 1’ (n 330), 33

³⁴⁴Pop, *Who Owns the Moon?* (n 5), 78

³⁴⁵Danilenko, ‘Outer Space and the Multilateral Treaty-Making Process’ (n 53), 332

³⁴⁶*Concise OED* (n 58), 1593

³⁴⁷A/AC.105/C.2/SR.61 (n 66), 8; A/AC.105/C.2/SR.63 (n 66), 8; A/AC.105/C.2/SR.71 (n 153), 15

³⁴⁸A/AC.105/C.2/SR.71 (n 153), 13; A/AC.105/C.2/SR.68 (n 66), 6; A/AC.105/C.2/SR.58 (n 331), 7

³⁴⁹CSLCA (n 48)

³⁵⁰Luxembourg Space Resources Law (n 74)

restriction. One of those restrictions is expressed in Article II of the Outer Space Treaty, which will be discussed in greater detail below. Another restriction or better put, condition, on the freedom of use, is the stipulation laid out in Article I that the use of space “shall be carried out for the benefit and in the interests of all countries...” and that such use “shall be the province of all mankind.”

The implications of that are not entirely clear. First, it is important to note that ‘province of all mankind’ is not synonymous with ‘common heritage of mankind’ as used in Law of the Sea Convention or the Moon Agreement.³⁵¹ Further, it applies to the *exploration and use* of outer space, the Moon and other celestial bodies not to outer space itself. Scholars have endeavoured to provide clarity on the meaning of these conditions to the freedoms expressed in Article I OST. Stephan Hobe notes that the notion of the ‘province of all mankind’ is in line with the regulation of other areas of the ‘global commons’ like the high seas and the deep seabed. However, there is no common pattern in the regulation of the ‘global commons’ each area has its own distinct regime.³⁵² Christol argues that the concept of the ‘province of mankind’ principle was meant to bolster the ‘in the interests and for the benefit of all’ concept, he says that the drafters saw little difference between province and benefit, but that this had a nuance that ‘benefit’ lacked on its own.³⁵³ Philip De Man has argued that the freedoms expressed in Article I are “qualified, *inter alia*, by the obligation to duly take into account the corresponding freedoms of other States.”³⁵⁴ Dembling and Arons argued that the language in Article I OST was largely designed and intended to prevent

³⁵¹Frans von der Dunk, ‘International Space Law’ in Frans von der Dunk and Fabio Tronchetti eds., *Handbook of Space Law* (Edward Elgar 2015), 57-58

³⁵² Hobe ‘Article 1’ (n 330), 27-29

³⁵³Christol *Space Law* (n 340), 70-71

³⁵⁴Philip De Man, ‘Rights Over Areas vs Resources in Outer Space: What’s the Use of Orbital Slots?’ (2012) 38 *Journal of Space Law* 39, 56

a ‘first come, first served’ approach to accessing celestial bodies and ensuring that the benefits of space were accessible to all States even if they were ‘latecomers.’³⁵⁵

In practice this aspect of Article I OST has not amounted to obligations on the part of space actors. For this reason, the ‘Space Benefits Declaration’ (UNGA Res 51/122)³⁵⁶ was promulgated. The Space Benefits Declaration arose out of a desire by developing states to more precisely define the terms of Article I of the Outer Space Treaty. Debate exists as to the legal effect of Article I of the Outer Space Treaty, does it create merely moral obligations or is it legally binding? As Elena Carpanelli and Brendan Cohen have written, even if Article I does create legal obligations, the vagueness of the terms involved does still cause issues “one wonders, for instance, whether only the ‘exploration and use’ must be beneficial, or also the resources resulting from this activity.”³⁵⁷ However, the vague nature of the provisions of the Declaration also substantially reduce its value as an authoritative means of interpretation of Article I of the Outer Space Treaty.³⁵⁸ That said, there is value in the Declaration on Space Benefits as a reaffirmation of the principle that space activities are meant to be for the benefit of all humankind, and could have an impact on interpretation, by a court, of Article I of the Outer Space Treaty either as a ‘subsequent agreement’ or ‘subsequent state practice’ as defined by Article 31(3) VCLT.³⁵⁹ Though perhaps the most significant impact of the Declaration on Space Benefits is to mark the end of the push by developing States for a more concrete expression of the principle that space is meant to be for the benefit of all humans. As Carpanelli and Cohen write “in this way,

³⁵⁵Paul G. Dembling and Daniel M. Arons, ‘The Evolution of the Outer Space Treaty’ (1967) 33 J. Air L. + Comm. 419, 430

³⁵⁶UNGA Res 51/122 (13 December 1996) UN Doc A/RES/51/122

³⁵⁷Elena Carpanelli and Brendan Cohen, ‘A Legal Assessment of the 1996 Declaration on Space Benefits on the Occasion of its Fifteenth Anniversary’ (2012) 38 Journal of Space Law 1, 5

³⁵⁸*Ibid*, 30

³⁵⁹*Ibid*, 19-23

they abandoned the claim that outer space, as the ‘common heritage of mankind,’ demanded the sharing of economic benefits that come from outer space activities...” in return the space powers reaffirmed their commitment to using space for the benefit of all countries and while this is not a legal obligation it does carry a moral weight.³⁶⁰

4.2.3 Article II

Article II is not long, and in order to aid discussion, it is worth including here.

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.

The question of what constitutes a ‘celestial body’ is examined in detail in the next chapter but for these purposes all naturally occurring physical objects in the solar system are considered ‘celestial bodies’ within the meaning of the Outer Space Treaty. This section will discuss the importance and role of Article II OST and the non-appropriation principle. Then, several aspects of Article II need to be examined, first does it apply to non-governmental entities (private companies, for example), but also what does national appropriation mean, as well as ‘use’ within the context of Article II, occupation and ‘by any other means’. There will also be examination of it within the context of Article I and the ‘object and purpose’ of the OST. Then a brief discussion of the impact of Article II OST on private property rights in outer space, though that will be discussed in more detail later.

Article II of the Outer Space Treaty is the other ‘most important article’ although it is possible that Article II OST is the most important, indeed it embodies what has been described as a “cardinal principle of space law.”³⁶¹ This principle, the non-appropriation principle, which Article II codifies, is widely, even universally

³⁶⁰*Ibid*, 32

³⁶¹Diederiks-Verschoor and Kopal, *An Introduction to Space Law* (n 15), 26

recognized as a fundamental principle of space law.³⁶² Furthermore, the non-appropriation principle was one of the earliest principles which was agreed upon and one which enjoys broad support.³⁶³ It has certainly attained the status of customary international law³⁶⁴ (and may even have done so before the Outer Space Treaty came into force)³⁶⁵ and some have even gone so far as to suggest that it has even attained the coveted status of a *jus cogens* norm.³⁶⁶ Though the case for this is less than convincing especially as the authors do not actually make a case they just declare it to be so. Which Matthew Saul says is actually fairly common for claims about *jus cogens*.³⁶⁷ However, it is abundantly clear that ‘non-appropriation’ is a fundamental principle of space law.

The scope of Article II OST has two elements, the geographical scope, and entities to which it applies. As mentioned, the article applies to outer space, the Moon and other celestial bodies which are taken to be all naturally occurring physical objects in outer space. That Article II applies to States is clear and unequivocal, however there have been those who argue that it does not apply to private individuals or entities such as

³⁶²Freeland and Jakhu ‘Article II’ (n 14), 45, 63; Diederiks-Verschoor and Kopal, *An Introduction to Space Law* (n 15), 26; Lee, ‘Article II of the Outer Space Treaty’ (n 14), 128; Tronchetti, ‘Legal Aspects of Space Resource Utilization’ (n 16), 778; Lee, *Law and Regulation of Commercial Mining* (n 10), 166; Pop, *Who Owns the Moon?* (n 5), 60; Lyall and Larsen, *Space Law* (n 18), 60-61

³⁶³Cohen ‘Introduction: Law and Politics in Space’ (n 27), 13, 18; Jenks, *Space Law* (n 34), 200; Paul G. Dembling and Daniel M. Arons, ‘The United Nations Celestial Bodies Convention’ 1966 33 J. Air L. + Com. 535, 535-537; Dembling and Arons ‘The Evolution of the Outer Space Treaty’ (n 355), 421-422; Crawford, *Brownlie’s Principles* (n 159), 347-348; Tronchetti, ‘Legal Aspects of Space Resource Utilization’ (n 16), 778

³⁶⁴Cohen ‘Introduction: Law and Politics in Space’ (n 27), 13, 18; Jenks, *Space Law* (n 34), 200; Lee, ‘Article II of the Outer Space Treaty’ (n 14), 134-135, 141; Freeland and Jakhu ‘Article II’ (n 14), 46-47, 63; Lyall and Larsen, *Space Law* (n 18), 180; Lee, *Law and Regulation of Commercial Mining* (n 10), 171; Larsen, ‘Asteroid Legal Regime’ (n 18), 289

³⁶⁵Andrew Haley, *Space Law and Government* (Appleton-Century-Crofts 1963), 124-129; Cohen ‘Introduction: Law and Politics in Space’ (n 27), 13, 18; Jenks, *Space Law* (n 34), 200; Dembling and Arons ‘The Evolution of the Outer Space Treaty’ (n 355), 421-422

³⁶⁶Freeland and Jakhu ‘Article II’ (n 14), 55, 63; Lee, *Law and Regulation of Commercial Mining* (n 10), 125-126; Imre Anthony Csabafi *The Concept of State Jurisdiction in International Space Law: A Study in the Progressive Development of Space Law in the United Nations* (Martinus Nijhoff 1971), 47

³⁶⁷Saul, ‘Identifying *Jus Cogens* Norms’ (n 20), 41

companies. Stephen Gorove is perhaps the most notable of those who have made this assertion. Gorove made the distinction based on whether the activities are carried out by or on the behalf of the government or whether they are private activities. Under his formulation it could only be a violation of Art II OST if done under the ‘supreme authority of the state.’³⁶⁸ Others have picked up on this,³⁶⁹ Lee argues that the wording of the Chinese text of the OST, Article 11 of the Moon Agreement and even UNCLOS indicates that ‘national appropriation’ in Article II OST “may mean no more than the ‘exercise of sovereignty.’ Accordingly, Article II does not prescribe any rights or duties concerning the assertion of title by private nationals, as long as they do not amount to an exercise of sovereignty by the state...”³⁷⁰ This does not stand up to scrutiny.

While Article II OST does not mention non-governmental entities, when considered in conjunction with Article VI OST it is clear that it applies to them. Treaty terms should be interpreted “in their context and in the light of its object and purpose.”³⁷¹ Article VI OST helps provide that context.

Article VI OST will be examined in detail in the next section, but it makes States responsible for the activities of their nationals in outer space and requires that they ‘authorise and continually supervise’ those activities. The authorisation is a key element, States cannot authorise that which they are prohibited from doing,³⁷² therefore States cannot authorise the ‘appropriation’ of outer space, the Moon and other celestial bodies by private entities. This view is backed up by the *Travaux*

³⁶⁸Stephen Gorove, ‘Interpreting Article II of the Outer Space Treaty’ (1968-69) 37 Fordham L. Rev. 349, 350-354

³⁶⁹Richard Berkley, ‘Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space’ (1997) 15 Wis. Int’l L.J. 421, 430

³⁷⁰Lee, ‘Article II of the Outer Space Treaty’ (n 14), 132-133

³⁷¹VCLT (n 157), Article 31(1)

³⁷²Crawford, *Brownlie’s Principles* (n 159), 213-214

Preparatoires of the OST³⁷³ and supported numerous scholars. As Ram S Jakhu, Joseph N. Pelton, and Yaw Otu Mankata Nyampong, write

States are under obligation to ensure compliance with the provisions of the Outer Space Treaty by their private entities. If private appropriation were permitted to appropriate outer space and celestial bodies, it would defeat the purpose of the treaty and nullify the common interest and freedom principles.³⁷⁴

Or as Tronchetti more succinctly puts it: “allowing private appropriation of outer space would go against the spirit and the idea behind the Outer Space Treaty.”³⁷⁵ Therefore, Article II applies to private entities just as much as it does to States, this is clear when the Article is interpreted in its context.

‘National appropriation’ as a phrase appears to only be used in space law, and there is no specific definition provided by the Outer Space Treaty. Therefore, it is reasonable to query what exactly is meant by the phrase. Looking at the ‘ordinary meaning’ of the phrase requires first taking the terms separately. ‘National’ is defined as “relating to the nation” or “owned, controlled, or financially supported by the State.”³⁷⁶ Now, given Article VI of the Outer Space Treaty (which provides context for the interpretation of the ‘ordinary meaning’) this is necessarily broader than the dictionary definition as the State is ‘responsible’ for the activities of their nationals in outer space and has to “authorise” those activities giving explicit State sanction to them, meaning, as discussed above ‘private’ appropriation is, within the *lex specialis* of space law, ‘national appropriation’. Appropriation means “to take for one’s own use”³⁷⁷ although notably it is generally regarded as being “unauthorised” acquisition,³⁷⁸ which may

³⁷³A/AC.105/C.2/SR.63 (n 66), 10; UNCOPUOS ‘Summary Record of the Sixty-Sixth Meeting’ (21 October 1966) UN DOC A/AC.105/C.2/SR.66, 12; A/AC.105/C.2/SR.67 (n 334), 3

³⁷⁴Jakhu, et al, *Space Mining and its Regulation* (n 12), 121

³⁷⁵Tronchetti, ‘Legal Aspects of Space Resource Utilization’ (n 16), 780

³⁷⁶*Concise OED* (n 58), 953

³⁷⁷*Concise OED* (n 58), 64

³⁷⁸*Ibid*, 64

have implications for the necessity of a multilateral regime for authorising space resource activities, which will be explored later. Based on the ‘ordinary meaning’ of the component parts of ‘national appropriation’ a reasonable working definition is proposed as ‘the acquisition, in whole or in part, of outer space, the Moon and other celestial bodies, for the exclusive use of the State or its nationals.’ Although, of course, it needs to be examined in context and in line with the object and purpose of the treaty. Article I OST states that “outer space, including the Moon and other celestial bodies, shall be free for exploration and use...” which necessarily means that there will be ‘exclusive use’ of parts of ‘outer space, including the Moon and other celestial bodies’. Indeed, this has been ‘tested’ as there have been claims that prolonged or ‘permanent’ occupation of an orbital slot amounts to a violation of Article II of the Outer Space Treaty. However as De Man points out the meaning of these claims would essentially make many of the uses of outer space effectively unlawful and it would be absurd to draft the Outer Space Treaty which says space is free for use, and then turn around and declare the most common uses of space to be unlawful.³⁷⁹ It is also important to note that Article II does not prohibit the exercise of ‘sovereignty’ in outer space. Indeed, through Articles VI and VIII States are required to exercise sovereignty over their nationals in outer space and ‘objects launched into outer space’ which are ‘carried’ on their registry. It is territorial sovereignty, the acquisition of territory on ‘the Moon and other celestial bodies’ which is prohibited. Furthermore, it is a stipulation that ‘use’ or ‘occupation’ or ‘anything else’ does not give rise to any rights inherent in the area. One of the key points about ownership is that rights are maintained “regardless of any actual or constructive control”³⁸⁰ whereas in outer space, as per Article II OST once

³⁷⁹De Man, ‘Rights Over Areas vs Resources in Outer Space’ (n 354), 54-56

³⁸⁰Bryan A. Garner eds, *Black’s Law Dictionary* (9th edn. West/Thompson Reuters 2009), 1215

‘use’ or ‘occupation’ et al is over any other State is free to make use of that area. This was a point that the Soviet delegation attempted to clarify during the drafting of the Outer Space Treaty in 1966 stating that “in other words no human activity on the moon or any other celestial body could be taken as justification for national appropriation.”³⁸¹ It is also worth noting that in accordance with ICJ cases, territorial acquisition under modern international law requires not only the “intention and will to act as sovereign” but also “some actual exercise or display of power and authority.”³⁸² As argued, Article II OST applies to private actors as well as governments by virtue of Article VI OST. This leads to a conclusion that property rights are prohibited. Indeed, Sir Kenneth Bailey, part of the Australian delegate to UNCOPUOS during the drafting process of the OST expressed concern that it was not sufficiently

clear that outer space was not subject to national sovereignty and that no one could acquire property rights in outer space, including on the moon and other celestial bodies, by use or occupation, or by any other means.³⁸³

However, despite Sir Kenneth’s concerns, there is broad agreement among scholars that Article II prohibits the creation of property rights.³⁸⁴ As Tronchetti stipulates

Private property exists only if a superior authority recognizes and protects it. But a private entity cannot legally rely on national law to acquire property over part of the ‘global commons’ of outer space. If a state were to recognize claims to extraterrestrial properties by its nationals, this would constitute an appropriation of outer space ‘by other means’, which is prohibited under Article II.³⁸⁵

Property rights, at least concerning land, requires a legal regime operating under the authority or protection of a sovereign power. As “States are forbidden from extending

³⁸¹A/AC.105/C.2/SR.63 (n 66), 10

³⁸²*Legal Status of Eastern Greenland (Den. v. Nor.)*, 1933 P.C.I.J. (ser. A/B) No. 53 (Apr. 5), 45-46; *Eritrea/Yemen – Phase I: Territorial Sovereignty and Scope of Dispute*, 1998 PCA, page 46, para 239-241

³⁸³A/AC.105/C.2/SR.71 (n 153), 15

³⁸⁴Freeland and Jakhu ‘Article II’ (n 14), 44-63, 50; Lee, *Law and Regulation of Commercial Mining* (n 10), 167; Berkley, ‘Space Law Versus Space Utilization’ (n 369), 429; Tronchetti, ‘The Space Resource Exploration and Utilization Act’ (n 50), 9

³⁸⁵Tronchetti, ‘Legal Aspects of Space Resource Utilization’ (n 16), 780-781

their territorial sovereignty over outer space or any parts of it.”³⁸⁶ They cannot grant landed property rights to their nationals, for as Thomas Gangale has argued, States cannot grant title to that which they themselves are incapable of obtaining title to.³⁸⁷ Furthermore, as the ability to exclude is central to property³⁸⁸ then it is in inherent conflict with Article I OST.³⁸⁹ Therefore, property rights over land are not possible in outer space. Although, Blount and Robinson, have argued that non-appropriation is primarily concerned with expansion of territory not property saying that "Article II functions to exclude outer space from the territory of States, thus appropriation only occurs when property rights flow from territorial claims."³⁹⁰ However, as the authors themselves admit "real property is directly connected to territorial sovereignty..."³⁹¹ Further, "the prohibition of national appropriation also precludes the appropriation of any national legislation on a territorial basis to validate a private claim to property."³⁹² That said, the situation regarding resources, especially once they have been extracted from the celestial body in which they are found, may be different.

The question of whether the non-appropriation principle extends to resources is one of the most debated in the field of space law.³⁹³ However, with discussions at UNCOPUOS in the wake of the US and Luxembourg space resources legislation there is ongoing development of customary international law, which while not yet an

³⁸⁶Tronchetti, 'The Space Resource Exploration and Utilization Act' (n 50), 7

³⁸⁷Gangale, *The Development of Outer Space* (n 8), 47

³⁸⁸Gregory S. Alexander and Eduardo M. Peñalver, *An Introduction to Property Theory* (CUP 2012), 4; C.B. Macpherson, 'The Meaning of Property' in C.B. Macpherson, eds., *Property: Mainstream and Critical Positions* (University of Toronto Press 1978), 4

³⁸⁹Virgiliu Pop, 'Appropriation in Outer Space: The relationship between land ownership and sovereignty on the celestial bodies' (2000) 16 *Space Policy* 275, 277; Ulrike M. Bohlmann, 'Legal Aspects of the 'Space Exploration Initiatives'' in Marietta Benkö and Kai-Uwe Schrogl eds., *Space Law: Current Problems and Perspective for Future Regulation* (Eleven 2005), 222-224

³⁹⁰PJ Blount and Christian J Robison 'One Small Step: The Impact of the U.S. Commercial Space Launch Competitiveness Act of 2015 on the Exploitation of Resources in Outer Space' (2016) 18 *North Carolina Journal of Law and Technology* 160, 168-170

³⁹¹Blount and Robison 'One Small Step' (n 390), 167

³⁹²Bohlmann, 'Legal Aspects of the 'Space Exploration Initiatives'' (n 389), 222

³⁹³Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies* (n 9), 219

international *opinio juris*, does indicate a growing acceptance of the compatibility of space resource activities with the Outer Space Treaty. Treaty terms can ‘evolve’ as the States Parties understanding of the term ‘evolves’ and has been argued the Outer Space Treaty is open to such ‘evolutionary interpretation.’ That said, this section will focus on the Outer Space Treaty itself and the contributions of scholars, particularly as while a customary development is crystallising it has not yet formed.

One of the key arguments, that resources, especially once extracted or removed from the celestial body they come from, are not subject to the non-appropriation principle is that the non-appropriation principle is primarily concerned with territory.³⁹⁴ The ‘ordinary meaning’ of the terms of the Outer Space Treaty do not provide much insight on their own on this point. As has been argued above, space resource activities can fall within the ‘ordinary meaning’ of ‘use’ as expressed in Article I OST but ‘non-appropriation’ is trickier. Resource extraction and ‘use’ *is* appropriation as it quite literally is taking “for one’s own use.”³⁹⁵ Even if that use is to sell to someone else. However, the context, and object and purpose of the Outer Space Treaty needs to be recalled when making this assessment and as has been argued in this work part of that object and purpose, as expressed in the preamble, is to facilitate ‘the exploration and use of outer space’³⁹⁶ which cannot happen, sustainably at least, without utilising space resources.³⁹⁷ Further, and while of limited value as scientific investigation is specifically endorsed by the Outer Space Treaty, and as Lyall and Larson have written exploration is legally different from economic exploitation,³⁹⁸ samples extracted from

³⁹⁴Freeland and Jakhu ‘Article II’ (n 14), 44-63, 45, 49; P.J. Blount, ‘Renovating Space: The Future of International Space Law’ (2012) 40 Denv. J. Intl’l L & Pol’y 515, 522-523; Blount and Robison ‘One Small Step’ (n 390), 168-170; Dula and Zheniun *Space Mineral Resources* (n 11), 303, 315; De Man, ‘Rights Over Areas vs Resources in Outer Space’ (n 354), 62

³⁹⁵*Concise OED* (n 58), 64

³⁹⁶Outer Space Treaty (n 1), preamble

³⁹⁷See the Paine Report et al - The National Commission on Space, *Pioneering the Space Frontier: The Report of the National Commission on Space* (Bantam Books 1986)

³⁹⁸Lyall and Larsen, *Space Law* (n 18), 186

celestial bodies can be appropriated and even sold.³⁹⁹ Additionally, there is some basis in the negotiation record to support the notion that resources are not covered by the non-appropriation principle, at least after being extracted from the celestial body they originated in.

There was concern expressed by the Austrian, and French delegations that there was potential confusion between the terms “non-appropriation” and “use” which should be clarified.⁴⁰⁰ Given that the Japanese delegation called for a specific provision requiring the preservation of celestial bodies, including their resources⁴⁰¹, which was not included in the final treaty and the clarification by the Soviet delegation that non-appropriation should be taken to mean that activities conducted in outer space do not give any ‘sovereign’ rights over the Moon or other celestial bodies⁴⁰², an inference can be drawn that resources were not intended to be covered within the scope of Article II of the Outer Space Treaty.

The territorial nature of Article II enjoys broad support from scholars. The *Cologne Commentary* says that the non-territorial nature of space was ‘confirmed’ by Article II OST and that the primary objective was to prevent a colonial ‘land rush’ in space.⁴⁰³ Blount agrees, stipulating that the ‘non-appropriation principle’ was primarily a security goal intended to prevent conflict over territory in space.⁴⁰⁴ The IAA study agrees saying that the non-appropriation principle only applies to territory.⁴⁰⁵ De Man argues that as Article II OST “neither mentions nor excludes” space resources then given that it “is an exception to the general rule of freedom of activity in outer space”

³⁹⁹Gangale, *The Development of Outer Space* (n 8), 42; Harvey, *Soviet and Russian Lunar Exploration* (n 31), 246

⁴⁰⁰A/AC.105/C.2/SR.58 (n 331), 3; A/AC.105/C.2/SR.63 (n 66), 8

⁴⁰¹A/AC.105/C.2/SR.58 (n 331), 7; A/AC.105/C.2/SR.68 (n 66), 6; A/AC.105/C.2/SR.71 (n 153), 13

⁴⁰²A/AC.105/C.2/SR.63 (n 66), 10

⁴⁰³Freeland and Jakhu ‘Article II’ (n 14), 44-63, 45, 49

⁴⁰⁴Blount, ‘Renovating Space’ (n 394), 522-523; Blount and Robison ‘One Small Step’ (n 390), 168-170

⁴⁰⁵Dula and Zheniun *Space Mineral Resources* (n 11), 303

it should be regarded as being inapplicable to space resources.⁴⁰⁶ That said, mining a celestial body out of existence, no matter how small, could be unlawful. Destruction is the ultimate form of appropriation and it would not be of benefit and in the interest of all States. Additionally, it would fail to take due regard for interests of all States.⁴⁰⁷

4.2.3 Article III

Article III of the Outer Space treaty declares that space activities shall be carried out “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”. This is an important point, space law does not exist in a vacuum, it is part and parcel of international law. While space law is a *lex specialis* or a ‘special regime’ which is law governing a specific matter (activities in outer space) it is also the case that, as discussed, “no special regime has ever been understood as independent from general law.”⁴⁰⁸ There are no legal regimes outside of general international law, when the ‘special regimes’ rules ‘run out’ they fall back upon general international law.⁴⁰⁹ This is made clear by Article III OST. The *Cologne Commentary* says that this makes Article III one of the “most essential articles in the Outer Space Treaty” as there was there was question as to whether space law was going to be a self-contained regime.⁴¹⁰ However, the OST establishes that space law is a *lex specialis* within the broader framework of international law. This has a few benefits for space law, as while there are not specific dispute resolution mechanisms available for space law nor set out in any of the space treaties, any disputes that do arise are capable of making use of the existing dispute resolutions

⁴⁰⁶De Man, ‘Rights Over Areas vs Resources in Outer Space’ (n 354), 62

⁴⁰⁷Jakhu, et al, *Space Mining and its Regulation* (n 12), 126

⁴⁰⁸Koskenniemi, ‘The Fate of Public International Law’ (n 136), 16

⁴⁰⁹*Ibid*, 17

⁴¹⁰Olivier Ribbelink, ‘Article III’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag 2009), 64-65

services (such as, but not limited to, the International Court of Justice). Additionally, the United Nations Charter applies in space, meaning the prohibition on the use of force, except in self-defence, applies too. As well as the general obligation to resolve disputes peacefully.⁴¹¹ This could be important in disputes over property or mineral rights should they arise in the future.

4.2.4 Article VI

As discussed, there is an argument that Article II and its prohibition on national appropriation of outer space, the Moon and other celestial bodies is only for the attention of States and does not apply to private individuals or corporations. However, given Article VI of the Outer Space Treaty this is not the case, as has been argued in the section on Article II OST above. Article VI says that:

“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...”

This article makes states responsible for the actions of their nationals (natural, legal, or otherwise) in space. In fact, it goes further and requires that their activities be authorized and supervised by the appropriate state. An examination of a handful of state space laws will reveal that States certainly feel obligated to authorise and supervise the activities of their nationals (legal or natural). The UK, for example, requires British nationals to gain authorisation for space activity regardless of where that activity is being conducted from.⁴¹² Even if a convincing argument could be made

⁴¹¹Charter of the United Nations, Article 2(3), Article 2(4), Article 51

⁴¹²Outer Space Act 1986 c38, Section 3(1); Space Industry Act 2018 c5, Section (3)(1)(a)

that Article VI has been misinterpreted given the *opinio juris* of states parties, the sheer number of occurrences and the duration of the practice, this principle has now become custom.

States cannot authorize their nationals to undertake actions that are prohibited to themselves, therefore as States are not permitted to appropriate outer space, the Moon or other celestial bodies they cannot authorize their nationals to do so either and as all activities of their nationals in space require their authorization their nationals are also subject to the Article II prohibitions. However, that does not mean that there is a prohibition on commercial mining operations. States can authorize and license ocean going fishing vessels without needing to lay claim to areas of the high seas where the fishing operations will be conducted. This is the line of reasoning followed by both the Luxembourg and American space mining laws. Therefore, private individuals, corporations etc are prohibited from appropriation of territory on the moon and other celestial bodies as are states. However, this does not necessarily apply to resources found within the moon and other celestial bodies as is explained elsewhere.

4.2.5 Article VIII

Article VIII lays out the basis for States to exercise jurisdiction over space objects and their personnel (in the event there are any.) The ‘State of registry’ “retains jurisdiction and control’ as per the article. Article VIII OST also clarifies that “objects launched into outer space, including objects landed or contracted on a celestial body...” do not have their ownership affected by their presence in outer space or on a celestial body.⁴¹³ Therefore, despite Art II OST “the State of registry is entitled to exercise its sovereignty over the registered space object.” The formulation of ‘jurisdiction and control’ found in Article VIII “avoids a reference to State sovereignty and national

⁴¹³Outer Space Treaty (n 1), Article VIII

territoriality in outer space – an area of non-appropriation.”⁴¹⁴ However, a mechanism for control and responsibility is still necessary for the maintenance of order in outer space therefore Article VII links to Articles VI and VII, which creates a chain of attribution for a space object and identifies one single state whose laws are applicable to the space object in question.⁴¹⁵ Much like the oceans, an absence of sovereignty is not meant to create unregulated lawlessness. Similarly, just as “jurisdiction with respect to the high seas *is not jurisdiction over the high seas as such*” [italics in original] jurisdiction in outer space is not over outer space, the Moon or any other celestial body but the space objects and human beings operating in outer space.⁴¹⁶

“Jurisdiction and control over a space object can only be executed by one of the launching States, namely the one which has registered the space object.”⁴¹⁷ The phrase ‘object launched into outer space’ is not specifically defined, nor is the term ‘space object’ however

“in practice, a common understanding of the term ‘space object’ exists. Accordingly, a space object is every object that was launched into outer space in order to explore or use outer space, as well as every object that is intended to be launched.”⁴¹⁸

There is no distinction between state objects and private objects, they are both equally subject to the ‘jurisdiction and control’ of the state of registry. The state of registry is key. Transfer of ownership of objects in outer space is possible but a transfer of ownership “does not imply a transfer of jurisdiction and control.” A bilateral agreement can ‘transfer’ liability and responsibility to another state but would not change the jurisdiction and control under international law. This is particularly a

⁴¹⁴Bernhard Schmidt-Tedd and Stephan Mick ‘Article VIII’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag 2009), 156

⁴¹⁵*Ibid*, 147

⁴¹⁶Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 61-62

⁴¹⁷Schmidt-Tedd and Mick ‘Article VIII’ (n 414), 147

⁴¹⁸*Ibid*, 150

problem for a transfer to a state that cannot be a launching state of the object in question as liability rests with the launching state.

Bernhard Schmidt-Tedd and Stephan Mick stipulate that “‘jurisdiction’ means the legislation and enforcement of laws and rules in relations to persons and objects.” They also stipulate that “Jurisdiction is decisive for the applicable law.” ‘Control’ as used in Article VIII “means the exclusive right and the actual possibility to supervise the activities of a space object and, if applicable, the personnel thereof.” In this context that “allows the ‘appropriate State Party’ to exercise ‘international responsibility for national activities’ and ‘continuing supervision’ under Article VI of the Outer Space Treaty.” It must be noted that “‘Jurisdiction and control’ must be read as ‘one block’.”⁴¹⁹ Furthermore,

The ‘control’ competence is more than a technical capability. It is the right of the State of registry ‘to adopt technical rules to achieve the space object mission’ and, if necessary, ‘to direct, to stop, modify and correct the elements of the space object and its mission’. ‘Control’ must be based on legitimate jurisdiction and not on factual control capabilities.⁴²⁰

Additionally, this competence always rests with the state and not with a non-governmental actor or private entity. As Schmidt-Tedd and Mick state “in contrast to general public international law, States’ international responsibility extends as well over activities of non-governmental and private entities.” Furthermore, “The legal consequence of jurisdiction and control is the applicability of the national law of the State of registry for the object launched into outer space, including over any personnel thereof.”⁴²¹

In relation to the mention of ‘ownership’ in Article VIII, Bernhard Schmidt-Tedd and Stephan Mick argue that

⁴¹⁹*Ibid*, 157

⁴²⁰*Ibid*, 157

⁴²¹*Ibid*, 158-159

Article VIII of the Outer Space Treaty does not establish ownership by means of a constitutive rule. It simply clarifies that ownership established on earth is not affected by the presence of those objects in outer space. More especially, the launch of an object in outer space does not lead to a loss of property or to the emergence of *res derelicta* or *res nullius*. The principle of non-appropriation of outer space as such does not affect ownership legally established on earth while those objects are in outer space.⁴²²

Ownership in Article VII refers to both private and state ownership, no distinction is made. The property law that applies to the space object in question is that of the state of registry as they are the ones with jurisdiction.⁴²³ However, there is still a problem with objects ‘constructed’ on a celestial body.⁴²⁴ Under Schmidt-Tedd and Mick’s reasoning this would only apply to structures like the International Space Station which was assembled out of numerous space objects which had been launched into outer space from Earth. However, given the possibility of constructing facilities on the Moon and other celestial bodies out of space derived resources it will be necessary to clarify this issue.⁴²⁵ A potential work around is one proposed by The Hague International Space Resources Governance Working Group, which is to create a new term, what they call a ‘space-made product.’⁴²⁶

4.3 The Moon Agreement

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies⁴²⁷, or the Moon Agreement, is the fifth in the series of major space law instruments. The treaty was adopted in 1979 but did not enter into force until 1984. The Moon Agreement has been ratified by only 18 States⁴²⁸ which has led to it being

⁴²²*Ibid*, 163

⁴²³*Ibid*, 163-164

⁴²⁴Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 11-14

⁴²⁵Thomas Cheney 'Space Settlement Governance: An Overview of Legal and Policy Issues' Research Paper 1 (Centre for a Spacefaring Civilization 2019), 11-12

⁴²⁶The Hague Working Group Building Blocks (n 61), Building Blocks 2.5 and 6

⁴²⁷Moon Agreement (n 2)

⁴²⁸A/AC.105/C.2/2019/CRP.3 (n 24)

regarded as a ‘failed’ treaty⁴²⁹, although it is an active treaty and binding on those States that are parties to it. It is also worth bearing in mind that there is the example of UNCLOS, which was negotiated around the same time as the Moon Agreement and also contains the Common Heritage of Mankind (CHM) principle, albeit independent of the Moon Agreement, and was also regarded as being a ‘failed treaty’ until it was ‘amended’ in 1994⁴³⁰, and now virtually all States have signed up to UNCLOS with the noticeable exception of the United States of America.⁴³¹

The Moon Agreement largely mirrors the Outer Space Treaty; however, the provisions of Article 11 develop, or attempt to develop, law on space resources and therefore warrants consideration. Though there are other provisions that warrant attention as well. Article 4 introduces the concept of ‘international equity’ (the idea that actors need to bear in mind the consequences for future generations of their actions and activities) into space legislation.⁴³² Article 6 of the Moon Agreement also expressly stipulates that there shall be freedom of scientific investigation⁴³³ and states that such freedom shall include a right to collect and remove physical samples for scientific purposes. Those samples “remain at the disposal” of the parties that collected them though the article does encourage them to make the samples, or at least portions of them, available to other States. Further, States are permitted to use “mineral and other

⁴²⁹ Freeland, ‘The Role of ‘Soft Law’’ (n 283), 17-18; Glenn H. Reynolds and Robert P. Merges, *Outer Space: Problems of Law and Policy* (2nd edn. Westview 1997), 116

⁴³⁰ Ram Jakhu, Steven Freeland, Stephan Hobe, and Fabio Tronchetti ‘Article 11 (Common Heritage of Mankind/International Regime)’ in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl and Peter Stubbe eds., *Cologne Commentary on Space Law*, vol 2 (1st edn, Carl Heymanns Verlag 2013), 390-395

⁴³¹ UN Division for Ocean Affairs and the Law of the Sea, ‘Chronological Lists of Ratifications of, Accessions and Successions to the Convention and the Related Agreements’ (8 April 2019) <https://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#The%20United%20Nations%20Convention%20on%20the%20Law%20of%20the%20Sea> accessed 10 January 2020

⁴³² Stephan Hobe and Fabio Tronchetti, ‘Article 4 (Province of All Mankind)’ in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl and Peter Stubbe eds., *Cologne Commentary on Space Law*, vol 2 (1st edn, Carl Heymanns Verlag 2013), 365

⁴³³ Moon Agreement (n 2), Art 6 (1)

substances” in support of scientific missions “in quantities appropriate...” to that mission.⁴³⁴ Which is explicit endorsement of what today would be referred to as *In Situ Resource Utilization* (ISRU). However, Tronchetti and Hobe have argued that this would not include ‘commercial’ ISRU operations,⁴³⁵ which would fall under Article 11. As Tronchetti writes “the [Moon] Agreement makes a clear distinction between activities of scientific and non-scientific, i.e., commercial nature.”⁴³⁶

Much of Article 11⁴³⁷ attempts to elaborate on the prohibition of national appropriation contained in Article II of the Outer Space Treaty. The first section of Article 11 declares that “the Moon and its natural resources are the common heritage of mankind.”⁴³⁸ There is no explanation of what exactly this means. However, “common heritage” is usually taken to be a stronger, more communal statement than the “province of all mankind” found in the Outer Space Treaty.⁴³⁹ However, it is a phrase which remains open to interpretation. It is also important to note that it is the exploration and use of outer space which is the ‘province of all mankind’ whereas it is the Moon and its natural resources which are the Common Heritage of Mankind.

The authors of the *Cologne Commentary* argue that the meaning of CHM in the Moon Agreement should be based on the Moon Agreement and not meanings in any other contexts (such as UNCLOS).⁴⁴⁰ However, while CHM as expressed in UNCLOS is not directly relevant to its meaning in the Moon Agreement it does demonstrate that

⁴³⁴*Ibid*, Art 6(2)

⁴³⁵Stephan Hobe and Fabio Tronchetti, ‘Article 6 (Scientific Investigations/Samples/Minerals)’ in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl and Peter Stubbe eds., *Cologne Commentary on Space Law*, vol 2 (1st edn, Carl Heymanns Verlag 2013), 370-371

⁴³⁶Fabio Tronchetti *Fundamentals of Space Law and Policy* (Springer 2013), 13

⁴³⁷Moon Agreement (n2), Art. 11.

⁴³⁸*Ibid*, art. 11 (1)

⁴³⁹Hobe ‘Article 1’ (n 330), 27-29; Jakhu, et al, ‘Article 11’ (n 430), 390-395; Tronchetti *Fundamentals of Space Law and Policy* (n 436), 13-14; Tanaka *The International Law of the Sea* (n 57), 16-19; von der Dunk, ‘International Space Law’ (n 351), 57-58

⁴⁴⁰Jakhu, et al, ‘Article 11’ (n 430), 394-395

the CHM principle, in and of itself, is not static and can evolve.⁴⁴¹ Indeed, it evolved during the discussion of the treaty itself, initially the developing world wanted an equal sharing of benefits, however, the final text stipulates that sharing should be on the basis of contributions made, which is in line with the likes of Intelsat, Intersuptnik and Inmarsat.⁴⁴²

Article 11 of the Moon Agreement is, however, far from establishing a clear and comprehensive regulation of the exploitation of lunar resources under the 'common heritage of mankind heading.' This agreement does not establish an international regime to govern such exploitation.⁴⁴³

Article 11 of the Moon Agreement lays a foundation for regulation, but it does not create a regime. A regime will need to be developed later by those States that are parties to the Moon Agreement. This is a further reason why the CHM principle is not 'set in stone' as the subsequent agreement, establishing the regime under Article 11 of the Moon Agreement, can 'adapt' and 'develop' the meaning of CHM.⁴⁴⁴

It is Section 5 of Article 11 that calls for the establishment of an international regime to govern the "exploitation of the natural resources of the Moon as such exploitation is about to become feasible."⁴⁴⁵ Granted, it does specify the Moon, but there is no reason the international regime could not be extended to cover all celestial bodies, indeed given the provision in Article 1 section 1 it should be interpreted as applying to all the "celestial bodies within the solar system, other than the Earth..." except where other agreements may apply.

Section 6 calls for State Parties to inform the United Nations Secretary General and the international scientific community of any resources they discover.⁴⁴⁶ This could

⁴⁴¹*Ibid*, 391

⁴⁴²*Ibid*, 393

⁴⁴³Tronchetti *Fundamentals of Space Law and Policy* (n 436), 14

⁴⁴⁴Gardiner *Treaty Interpretation* (n 26), 242-253

⁴⁴⁵Moon Agreement (n 2), Art. 11, section 5

⁴⁴⁶*Ibid*, Art. 11, section 6

have implications for commercial confidentiality. Nevertheless, terrestrial resource extraction will necessarily involve disclosure of the proposed site of operations so steps can be taken to protect the rights of the discoverer.

Section 7(d) calls for an equitable sharing of the benefits of the resources of the Moon.⁴⁴⁷ This is one of the features that causes much of the opposition to the Moon Agreement,⁴⁴⁸ however it is worth noting that equitable does not mean equal, it essentially means fair. In total, Article 11 of the Moon Agreement would provide a mechanism for providing legal certainty vis-a-vis space resources.

However, given the general rejection of the treaty by the international community it is unlikely that a substantial space resources governance framework will be developed under the auspices of Article 11 of the Moon Agreement. However, it remains relevant as there are several parties to the Moon Agreement and the number is steadily increasing. Further, those State Parties to the Moon Agreement have an obligation to establish an international regime when space resource activities become feasible, which could potentially have implications for the unity of space law. ‘Fragmentation’ of space law, as with international law in general, is something to be avoided.

4.4 UNCLOS

UNCLOS was negotiated around the same time as the Moon Agreement and can help provide useful context for Article 11. Further, the seabed mining regime laid out in UNCLOS is a useful model for consideration for application to outer space, with or without the Moon Agreement. Therefore, while UNCLOS does not apply to outer space, it is important to examine its provisions on resources. There are several different aspects of resource governance under the law of the sea. The seabed mining regime is

⁴⁴⁷*Ibid*, Art. 11, section 7(d)

⁴⁴⁸Peter Malanczuk, *Akehurst's Modern Introduction to International Law* (7th edn, Routledge 1997), 206; Reynolds and Merges, *Outer Space* (m 429), 114

certainly worth examining given its obvious value as an analogous regime to space resources. An overview of the Law of the Sea will be undertaken first before examining the specific analogy of seabed mining, and the Common Heritage of Mankind principle.

“The freedom of the open sea has never meant unregulated lawlessness.”⁴⁴⁹ And today the high seas are regulated by the United Nations Convention on the Law of the Sea (UNCLOS)⁴⁵⁰ which enjoys near universal accession⁴⁵¹ and even the prime hold out, the United States, recognizes its validity generally, particularly as a codification of pre-existing customary international law.⁴⁵² UNCLOS divides the ocean into five categories: internal waters, territorial seas, archipelagic waters, the Exclusive Economic Zone (EEZ) and the high seas. The EEZ and the high seas are what is mainly relevant for this enquiry however, the territorial sea will also be considered. The breadth of the territorial sea is set at 12 miles but the EEZ can be extended out to 200 miles from the coast (there are specific rules for how to do this but as they are not relevant, they will not be outlined here.) UNCLOS also created the International Seabed Authority (ISA) and the International Tribunal for the Law of the Sea (ITLOS). UNCLOS was negotiated at approximately the same time as the Moon Agreement and there was ‘cross fertilization’ of many ideas, particularly surrounding mining of the high seas seabed.⁴⁵³ However, UNCLOS goes into considerably more detail than

⁴⁴⁹Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 61

⁴⁵⁰UNCLOS (n 57)

⁴⁵¹UNCLOS Status (n 431)

⁴⁵²Roncevert Ganan Almond ‘U.S. Ratification of the Law of the Sea Convention’ (*The Diplomat* 24 May 2017) <<https://thediplomat.com/2017/05/u-s-ratification-of-the-law-of-the-sea-convention/>> accessed 10 January 2020; National Security Decision Directive Number 83 ‘United States Oceans Policy, Law of the Sea and Exclusive Economic Zone’ (10 March 1983) <<https://fas.org/irp/offdocs/nsdd/nsdd-83.pdf>> accessed 10 January 2020

⁴⁵³Stephan Hobe, Peter Stubbe and Fabio Tronchetti ‘Historical Background and Context’ in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl and Peter Stubbe eds., *Cologne Commentary on Space Law*, vol 2 (1st edn, Carl Heymanns Verlag 2013), 337; Jakhu, et al, ‘Article 11’ (n 430), 390-395

Article 11 of the Moon Agreement and while both treaties contain the phrase ‘Common Heritage of Mankind’ and declare the resources of their respective areas to be such,⁴⁵⁴ they are separate treaties for separate spheres of international law and therefore need to be considered separately (i.e. the definition of Common Heritage of Mankind in UNCLOS does not necessarily impact the definition in the Moon Agreement.) However, UNCLOS initially shared a similar fate to that of the Moon Agreement and for similar reasons as the developed countries objected to the technology and benefits sharing provisions of UNCLOS as well as a general unease with the Common Heritage of Mankind principle.⁴⁵⁵ However, unlike the Moon Agreement, UNCLOS was rescued from failure by the Implementation Agreement of 1994 which smoothed the way for the industrialised states to ratify it as it modified the objectional sections of Part XI⁴⁵⁶, and as a result UNCLOS received sufficient ratifications and became effective on 16 November 1994 (having been opened for signature on 10 December 1982).⁴⁵⁷ UNLCOS now has 168 parties,⁴⁵⁸ with the most notable exception being the United States (although the US has signed the Implementation Agreement).⁴⁵⁹

4.4.1 Seabed Mining and the ‘Area’

Part XI of the Law of the Sea Convention discusses seabed mining. It establishes ‘the Area’ which encompasses the seabed of the high seas. “The limits of the Area are the seaward limit of the continental shelf in the legal sense.”⁴⁶⁰ And this is “determined

⁴⁵⁴UNCLOS (n 57), preamble, para 6, Article 136; Moon Agreement (n 2), Article 11(1)

⁴⁵⁵Jakhu, et al, ‘Article 11’ (n 430), 388-399

⁴⁵⁶Tanaka *The International Law of the Sea* (n 57), 33

⁴⁵⁷UNCLOS Status (n 431)

⁴⁵⁸*Ibid*

⁴⁵⁹*Ibid*

⁴⁶⁰Tanaka *The International Law of the Sea* (n 57), 178

by each State in conformity with international law.”⁴⁶¹ The International Seabed Authority does not have the power to affect the limits of the area.

Prior to UNCLOS III the view had been that the legal status of seabed resources would either be divided among coastal states along the lines of the continental shelf, or resources would be *res communis* or *res nullius*. Any of those would disadvantage developing states, especially those without coasts. So Common Heritage of Mankind was introduced as a way to fairly distribute benefits of seabed resources. This “principle had been already introduced into space law, the LOSC established a more advanced mechanism.”⁴⁶² UNCLOS also stipulates that activities in the Area shall be carried out for the benefit of humanity as a whole⁴⁶³ and that the Authority shall provide equitable sharing of financial or economic benefits from Seabed resources.⁴⁶⁴ Tanaka argues that the Common Heritage of Mankind principle and benefits sharing are “intimately intertwined.”⁴⁶⁵

Within UNCLOS “all rights in the resources of the Area are vested in mankind as a whole, on whose behalf the Authority shall act by virtue of Article 137(2)”⁴⁶⁶ and Article 133(a) defines ‘resources’ as ‘all solid, liquid or gaseous mineral resources’ *in situ* in the Area at or beneath the seabed and this includes polymetallic nodules.⁴⁶⁷ As with outer space, appropriation of the ‘Area’ is prohibited, however unlike space law UNCLOS also stipulates that appropriation of its resources are also prohibited except for under the supervision of the ‘Authority’. Therefore, as Tanaka stipulates “the Area must be distinguished from *res communis*.”⁴⁶⁸

⁴⁶¹*Ibid*, 178

⁴⁶²*Ibid*, 178-180

⁴⁶³UNCLOS (n 57), Article 140(1)

⁴⁶⁴*Ibid*, Article 140(2)

⁴⁶⁵Tanaka *The International Law of the Sea* (n 57), 180-181

⁴⁶⁶*Ibid*, 180

⁴⁶⁷UNCLOS (n 57), Article 133(a)

⁴⁶⁸Tanaka *The International Law of the Sea* (n 57), 180

Article 153(1) says that all the activities in the Area “shall be organised, carried out and controlled by the Authority on behalf of mankind as a whole.”⁴⁶⁹ ‘Activities in the Area’ means all activities of exploration for and exploitation of, the resources of the Area. This includes “the recovery of minerals from the seabed and their lifting to the water surface” and essentially everything else.⁴⁷⁰

Only activities connected with the exploration and exploitation of the Area’s mineral resources require permission of the Authority, activities unconnected with such endeavours do not require such permission. The Authority has broad jurisdiction but only over the ‘Area’ and resources activities conducted within the Area. The Authority also has jurisdiction over all natural and legal persons conducted resource activities within the Area and has the power to sanction non-compliance. All operators in the Area must gain approval from the Authority. The Authority can carry out mining operations itself via the Enterprise, however the Enterprise has never been established. When applying for permission to conduct operations the operational area requested has to be able to support two viable mining operations. The Authority designates part of this as a reserve area for the Enterprise or developing states and allows the applicant to operate in the remaining area. Many industrialized states refused to accept provisions of Part XI in particular, and therefore did not ratify the convention. In order to address this lack of ratification the 1994 ‘Implementation Agreement’ was created. The ‘Implementation Agreement’ modified Part XI of the LOSC, to move it towards a more market orientated approach to accommodate concerns of the industrialised states. One such modification is the removal of the mandatory transfer of technology.⁴⁷¹ UNCLOS represents a potential solution to the issues faced by space

⁴⁶⁹ UNCLOS (n 57), Article 153(1)

⁴⁷⁰ Tanaka *The International Law of the Sea* (n 57), 181

⁴⁷¹ *Ibid*, 182-192

resources, an International Seabed Authority for space would have the jurisdictional authority to grant the certainty desired, at least to those party to the agreement. Further, while it would be natural for it to be established under Article 11 of the Moon Agreement there is no reason that it could not be a separate agreement independent of the Moon Agreement. However, as will be argued elsewhere in this work, it is premature to establish such a formal institution.

4.5 Conclusion

The Outer Space Treaty proves the foundational framework from which the entire space governance regime emanates. Therefore, it is imperative to examine the key provisions of the Outer Space Treaty in order to be able to discuss property rights given that all of the potential issues stem from the Outer Space Treaty. While it is arguable that customary international law recognized outer space as *res communis* rather than *res nullius* it is the Outer Space Treaty that codified that reality and therefore it is central to this enquiry to understand what it means. The Moon Agreement, specifically Article 11 is also looked at because it directly addresses space resources although as argued its actual relevance is limited given the low number of participants, but it does pose a potential threat to the unity of space law if the parties to the Moon Agreement opt to create a framework under Article 11 separately from whatever develops as a result of actions taken by those states which are only party to the Outer Space Treaty. This risk is exacerbated if further states, like the Russian Federation, join the Moon Agreement.

The key objective of this chapter was to examine the definition of ‘use’ in Article I OST. This chapter makes the argument that, as indicated by the preamble, part of the ‘object and purpose of the Outer Space Treaty is to facilitate the use and development of outer space. This when combined with a ‘plain ordinary’ reading of ‘use’ in Article

I OST supports a broad interpretation of the ‘term’ use, which would fit space resource activities within it. This is further supported by the *travaux préparatoires* as argued in this chapter. Therefore this chapter argues that space resource activities fall within the scope of the freedom of use as enumerated by Article I of the Outer Space Treaty, however this is subject to a few limitations such as the non-appropriation principle codified in Article II of the Outer Space Treaty.

Article II is a fundamental aspect of space law and enjoys broad support. As this chapter argues it applies to non-governmental actors by virtue of Article VI of the Outer Space Treaty, although the obligation to ensure compliance rests on the state responsible for that non-governmental actor. Regarding the meaning of ‘national appropriation’, this article makes the case that national appropriation should be interpreted to mean ‘the acquisition, in whole or in part, of outer space, the Moon and other celestial bodies, for the exclusive use of the State or its nationals.’ However, as evidenced by ‘orbital slots’ prolonged use does not amount to appropriation. The provision is intended to apply to acquisition of territory or property rights over land. This chapter also makes the argument, supported by Chapter Nine that the application of Article II to space resources has developed, even if non-appropriation did apply to extracted resources there is growing acceptance, albeit not yet sufficiently crystallised to be described as a customary norm, that resources once removed from the celestial body are appropriable. This is further supported by the object and purpose of the Outer Space Treaty, which as argued above is to facilitate the use and development of outer space. Resources are needed for that. Finally, the debates during the negotiation of the Outer Space Treaty clearly indicated that the intention was Article II ensures that activities do not give rise to sovereign rights over territory not that the article should prohibit activity.

With regards to Article VI this chapter explains how this ties non-state actors to the provisions of the Outer Space Treaty, albeit via the state that is ‘responsible’ for ‘authorising and supervising’ their activities. The space resources legislation of the United States and Luxembourg need to be viewed through the prism of Article VI as those pieces of national legislation provide a mechanism for those countries to undertake that ‘authorisation and supervision.’

Article VIII is also discussed as jurisdiction is an important aspect of this enquiry. This chapter makes the argument that jurisdiction in space operates on a quasi-territorial basis over objects and on a personal basis over personnel. Further, Article VIII confirms that an object being in space does not have its ownership status changed by virtue of its being in outer space.

The chapter also examines Article 11 of the Moon Agreement, though as mentioned while this directly addresses space resources given the low take-up of the treaty it is of limited relevance. However, it does have the potential to spur a ‘fragmentation’ of the space law framework if the Moon Agreement states and the OST states diverge in their approaches. It also looked at the relevant provisions of UNCLOS as a point of comparison as well as a potential model for a space resources governance framework. The primary contribution of this chapter is the finding that ‘use’ is a broad freedom under the Outer Space Treaty that has scope to permit space resource activities. Secondly, that the territorial nature of Article II allows scope for the acquisition of ownership of resources once they have been extracted from the celestial body they have originated in. These have been core questions regarding space resources, as argued in this chapter and elsewhere in this work are in the process of being resolved by the international community.

The next chapter examines the concept of ‘celestial body’ which is important as it speaks to the scope of application of the Outer Space Treaty which applies to Outer Space, including the Moon and other celestial bodies. Further, it has been suggested that certain asteroids might be ‘too small’ to be classified as celestial bodies and therefore not be subject to Article II of the Outer Space Treaty thus being free for appropriation. However, as will be argued in the next chapter, this is not the case.

Chapter Five: What is a Celestial Body?

5.1 Introduction

The previous chapter examined the Outer Space Treaty, and Article 11 of the Moon Agreement. The Outer Space Treaty provides the foundational framework for space governance and applies to outer space, including the Moon and other celestial bodies. As discussed in the previous chapter while the freedom of use declared in Article I OST provides scope for space resource activities this freedom is limited by, among other things, the non-appropriation principle which stipulates that outer space, including the Moon and other celestial bodies cannot be appropriated. This chapter will determine what exactly is meant by ‘celestial bodies.’

The term ‘celestial bodies’ is used frequently in the treaties and throughout the secondary literature, yet there is no clear, established, agreed upon definition of the term. The term ‘celestial bodies’ was used in the very first work on space law, written by Vladimir Mandl in 1932 and was subsequently used in later writings during the 1950s and ‘60s.⁴⁷² It was also used in several of the UN General Assembly resolutions⁴⁷³ relating to space passed at the opening of the ‘space race’ and in the Outer Space Treaty and later Moon Agreement. However, despite using the term and its incorporation within the full title of both the Outer Space Treaty and the Moon Agreement no definition of the term ‘celestial bodies’ is provided in either treaty. This is, as has been noted by Stephan Hobe, odd for both a UN treaty of a general nature and, in the case of the Outer Space Treaty, the first treaty to deal with outer space.⁴⁷⁴

⁴⁷²Fasan, ‘Asteroids and other Celestial Bodies’ (n 4), 33

⁴⁷³UNGA Res 1721 (XVI) (20 December 1961) UN Doc A/A987; UNGA Res 1962 (n 211); UNGA Res 1963 (XVIII) (13 December 1963)

⁴⁷⁴Stephan Hobe, ‘Article 1’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag 2009), 29

This issue needs to be addressed as the definition of the term could potentially affect which naturally occurring space objects are subject to the terms of the Outer Space Treaty, and specifically which fall under the prohibition on national appropriation laid out in Article II of the Outer Space Treaty. If a naturally occurring space object is not a celestial body, then it may not fall under that prohibition. If asteroids, or even certain asteroids, are for example, not celestial bodies, at least in the legal sense as meant by the treaties, then they would be free for appropriation.

This chapter will take an in-depth examination of the definition of a celestial body. First it will look at what space law scholars have already said on the topic, before taking a look at what the space law treaties actually say and examining those terms in light of the *travaux préparatoires*. However, as in line with the VCLT, the main focus is on the ‘ordinary meaning’ of the treaty terms, taking the dictionary definition as a primary guide as to ‘ordinary meaning’. Though, as it is sometimes appropriate to consider specialist or scientific definitions of terms, this chapter will then examine the scientific definition of the term celestial body. This is particularly useful as it could be possible for space law to create a new definition or even to categorize celestial bodies in a future space resources framework. However, the findings of this chapter would suggest that this would not be a prudent course of action. Finally, the chapter will examine ‘legal’ approaches to defining or categorizing celestial bodies, building on the work of Fasan and Pop. This essentially boils down to categorizing celestial bodies by virtue of size or their ability to be moved by human intervention. However, the argument ultimately made by this chapter is that celestial bodies as used in the space law treaties apply to all naturally occurring objects in outer space regardless of their ability to be moved by human intervention or their size. Further, it makes the case that

regardless of the merits of any future legal categorization of celestial bodies it is premature to do so on the basis of existing planetary science.

5.2 Defining a Celestial Body

The issue of the lack of a definition has not gone unnoticed by space law scholars. Fabio Tronchetti asserts that the phrase ‘celestial bodies’ includes asteroids and the Moon⁴⁷⁵ but in his discussion of the legal status of celestial bodies in the *Handbook of Space Law* he makes no attempt to define the term ‘celestial body’ and is more interested in the legal status of resources than in the legal status or definition of ‘celestial bodies’ themselves.⁴⁷⁶ Francis Lyall and Paul B. Larsen argued that the term ‘celestial bodies’ has not yet been legally defined, and that even the category of ‘planet’ is far from being concretely established.⁴⁷⁷ Ernst Fasan says that the legal status of the Moon is quite clear as it is specifically mentioned in the treaties, and that it is similarly clear that the planets are, at least in the legal sense, ‘celestial bodies’. He goes on to question whether altering the orbit of an asteroid would constitute ‘use’ as defined and permitted by the treaties, and whether an asteroid that is hollowed out and turned into a giant space station would remain a ‘celestial body’ or would it become a ‘space object’? Fasan says, speaking of the drafters of the Outer Space Treaty in regard to ‘celestial bodies’, that “obviously they had substantial natural objects in mind.” Fasan broadly agrees with Working Group Three of the International Institute of Space Law in defining ‘celestial bodies’ as natural objects that cannot be moved from their natural orbits.⁴⁷⁸

⁴⁷⁵Fabio Tronchetti, ‘Private Property Rights on Asteroid Resources: Assessing the Legality of the ASTEROIDS Act’ (2014) 30 Space Policy 193, 194

⁴⁷⁶Tronchetti, ‘Legal Aspects of Space Resource Utilization’ (n 16), 777-778

⁴⁷⁷Lyall and Larsen, *Space Law* (n 18), 175-176

⁴⁷⁸Fasan, ‘Asteroids and other Celestial Bodies’ (n 4), 38-40

Virgiliu Pop has argued that the lack of a legal definition of ‘celestial bodies’ provides a potential way to circumvent the non-appropriation principle of Article II of the Outer Space Treaty by declaring asteroids and comets as not being ‘celestial bodies’ and therefore not falling under the purview of the Outer Space Treaty⁴⁷⁹, Pop does not address the fact that even if these bodies are not, legally speaking, ‘celestial bodies’ they are still in outer space.

Pop raises the questions as to the whether all astronomical objects are ‘things’ or ‘celestial objects’ in the legal sense? And does that even include quasars in distant galaxies? He points out that the Outer Space Treaty provides no spatial limitation, whereas the Moon Agreement limits its application to this solar system, which Pop argues is a reasonable limitation to adopt.⁴⁸⁰

Pop also discusses the possible methods for legally defining what constitutes a celestial body. Pop discusses four approaches, which he refers to as the spatialist approach, the control approach, the functionalist approach and the ‘space object approach’, all of which will be discussed in greater detail below. Ultimately Pop feels that it will be customary international law derived from actual practice that resolves the issue of the legal definition of ‘celestial bodies.’⁴⁸¹

Ricky J. Lee proposes two potential regimes for determining what legally speaking constitutes a celestial body, one based on the existence or absence of a human economic value, and one based on the existence of a solid surface for the landing of space vehicles. He also discusses the position advocated by Fasan that a celestial body is any natural object that cannot be artificially moved by humans as well as discussing the potential of classifying natural objects based on their size. Though he highlights

⁴⁷⁹Pop, ‘A Celestial Body is a Celestial Body is a Celestial Body...’ (n 5); Pop, *Who Owns the Moon?* (n 5), 58

⁴⁸⁰Pop, ‘A Celestial Body is a Celestial Body is a Celestial Body...’ (n 5)

⁴⁸¹Pop, *Who Owns the Moon?* (n 5), 51-58

that the ever changing definitions of what bodies humans have an interest in and those that we are able to move would create an unwanted uncertainty in the legal definition of ‘celestial bodies’.⁴⁸²

5.3 Treaty Term

‘Celestial bodies’ is a term that is frequently used in the space treaties. With the exception of the last four articles (which deal with ratification of and withdrawal from the treaty), each article of the Outer Space Treaty uses the phrase ‘outer space, including the Moon and other celestial bodies.’ The full title of the treaty also includes ‘celestial bodies’ within it, it is quite clear that ‘celestial bodies’ are included within the scope of application of the Outer Space Treaty, despite there being no definition of that term. The Moon Agreement also fails to provide a definition of the term ‘celestial bodies’ despite Article 1 of the Moon Agreement also including ‘celestial bodies’ within the scope of application of the treaty, along with its primary focus, the Moon. However, it is important to note that initially the Moon Agreement was limited in application to just the Moon, the expansion of the treaty’s scope to include ‘other celestial bodies’ happened at the last minute.⁴⁸³

In the UN resolution establishing the *ad hoc* Committee on the Peaceful Uses of Outer Space (COPUOS), only the term outer space was used, there was no specific mention of either the Moon or celestial bodies.⁴⁸⁴ The resolution passed in the following year, UNGA Resolution 1472, which established COPUOS as a permanent body also only mentioned outer space.⁴⁸⁵ It was not until 1961 that the phrase ‘celestial bodies’ was used in a UN document, specifically UNGA Resolution 1721.⁴⁸⁶

⁴⁸²Lee, *Law and Regulation of Commercial Mining* (n 10), 187-191

⁴⁸³Cheng, *Studies In International Space Law* (n 195), 362-363

⁴⁸⁴UNGA Res 1348 (XIII) (13 December 1958)

⁴⁸⁵UNGA Res 1472 (XIV) (12 December 1959)

⁴⁸⁶UNGA Res 1721 (n 473)

It is clear from the *Travaux Préparatoires* of the Outer Space Treaty that the notion that the term ‘celestial bodies’ included the moon and the planets was both generally accepted and uncontroversial.⁴⁸⁷ The phrases ‘the Moon and other celestial bodies’ and ‘outer space and celestial bodies’ are frequently used interchangeably, again indicating that the Moon is a celestial body like any other, although it was often regarded as worth special, specific mention though not a distinct legal categorization.⁴⁸⁸

The position of the United States and the Soviet Union was not particularly far from one another on this point, the initial US draft proposal was simply called the ‘celestial bodies treaty’⁴⁸⁹, although later draft proposals titles included ‘the Moon and Other Celestial Bodies’⁴⁹⁰ whereas the USSR treaty proposal included the full phrase ‘outer space, including the Moon and other celestial bodies’⁴⁹¹ that was incorporated in the final text of the treaty. The United States eventually gave way and accepted the inclusion of the term ‘outer space.’ None of the draft proposals included a definition of either the terms ‘outer space’ or ‘celestial bodies.’

⁴⁸⁷United Nations General Assembly ‘Letter Dated 9 May 1966 from the Permanent Representative of the United States of America to the United Nations Addressed to the Secretary General’ (10 May 1966) UN Doc A/6327; United Nations General Assembly ‘Union of Soviet Socialist Republics: Request for the Inclusion of an Item in the Provisional Agenda of the Twenty-first Session’ (31 May 1966) UN Doc A/6341

⁴⁸⁸United Nations General Assembly ‘Letter Dated 4 October 1966 from the Representative of the Union of Soviet Socialist Republics to the Secretary-General’ (5 October 1966) UN Doc A/6352/REV.1; UNCOPUOS ‘United States of America – Draft Treaty Governing the Exploration of the Moon and Other Celestial Bodies’ (11 July 1966) UN Doc A/AC.105/C.2/L.12

⁴⁸⁹UNCOPUOS, ‘Letter Dated 16 June 1966 From the Permanent Representative of the United States of America addressed to the Chairman of the Committee on the Peaceful Uses of Outer Space’ (17 June 1966) UN Doc A/AC.105/32

⁴⁹⁰UN Doc A/AC.105/C.2/L.12 (n 488)

⁴⁹¹UN Doc A/6352/REV.1 (n 488); UNCOPUOS ‘Letter Dated 11 July 1966 Addressed to the Chairman of the Legal Sub-Committee By the Representatives of the USSR’ (11 July 1966) UN Doc A/AC.105/C.2/L.13

5.3.1 The Ordinary Meaning of ‘Celestial Body’

The term celestial body does not appear in the *Oxford English Dictionary*, requiring an examination of its component parts. The *Concise Oxford English Dictionary* defines ‘celestial’ as something “positioned in or relating to the sky or outer space”⁴⁹², with ‘space’ being defined as the area beyond the Earth’s atmosphere containing all of the planets, stars, galaxies, in short the rest of the universe.⁴⁹³ The term ‘body’ is defined by *Oxford* as “the main or central part of something, a mass or a collection.”⁴⁹⁴ From this it is reasonable to regard the ‘dictionary definition’ of the term ‘celestial body’ as ‘the main or central part of a naturally occurring mass that is located beyond the Earth’s atmosphere.’

Recourse can be made to dictionaries to find the ‘ordinary meaning’ of terms, even specialist dictionaries, and indeed the courts have done so. However, it must be remembered that the dictionary definition, even if abundantly clear, still needs to be checked against the object and purpose of the treaty as well as its context.⁴⁹⁵ The object and purpose of the Outer Space Treaty, was broadly to foster greater international cooperation in space, particularly scientific exploration and use of outer space, the Moon and other celestial bodies⁴⁹⁶, as well as forestall a ‘colonial land grab’ in outer space.⁴⁹⁷ Lyndon Johnson, then President of the United States, viewed the Outer Space Treaty primarily as an arms control treaty⁴⁹⁸, however while the treaty does prohibit the placement of weapons of mass destruction in outer space, on the Moon and other

⁴⁹²*Concise OED* (n 58), 228

⁴⁹³*Ibid*, 1381

⁴⁹⁴*Ibid*, 154

⁴⁹⁵Gardiner *Treaty Interpretation* (n 26), 186-189

⁴⁹⁶Outer Space Treaty (n 1), Preamble

⁴⁹⁷Blount and Robison ‘One Small Step’ (n 390), 164-169; McDougall, *The Heavens and the Earth* (n 55), 187

⁴⁹⁸McDougall, *The Heavens and the Earth* (n 55), 177-194, 420; Cheng, *Studies In International Space Law* (n 195), 215; Robert Dallek, ‘Johnson, Project Apollo and the Politics of Space Program Planning’ in Roger D. Launius and Howard E. McCurdy eds., *Spaceflight and the Myth of Presidential Leadership* (University of Illinois Press 1997), 81

celestial bodies and prohibit “the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies”⁴⁹⁹ it is not the primary focus of the treaty itself as evidenced by the fact that these issues are concentrated in a single article. Additionally, it is worth considering scope of the treaty. The Outer Space Treaty applies to ‘outer space’ in addition to the Moon and other celestial bodies. There is no definition of ‘outer space’ provided by the treaty, however the Moon Agreement does limit itself to application in the solar system.⁵⁰⁰ The lack of such a limitation in the Outer Space Treaty suggests a broader application, furthermore, if one is going to argue a broader understanding of such terms as ‘use’ then that broad interpretation needs to be adopted for the rest of the treaty unless there is a specific reason to do otherwise. This therefore endorses a broad interpretation of the term ‘celestial body’ to include any naturally occurring mass that is ‘located beyond the Earth’s atmosphere.’

5.4 Scientific Definitions

Given the lack of definitions provided by the treaties it is useful to consider the definitions provided by the scientific community. However, the definitions of astronomical terms as provided by the scientific community are not necessarily the best definitions to use in order to construct a legal regime. Not only can the meaning of the term change, but the object in question can shift categories over time, therefore inviting uncertainty somewhat defeating the purpose of a legal definition. Furthermore, while scientific bodies such as the International Astronomical Union (IAU) are influential their categorizations have no legal authority.

Regarding the value of scientific facts as a source of space law, Jenks wrote that

⁴⁹⁹Outer Space Treaty (n 1), Article IV

⁵⁰⁰Moon Agreement (n 2), Article 1(1)

scientific facts and evidence of acquiescence, both of which bulk largely in the literature of space law, should not be regarded as independent sources of legal obligation the significance and weight of which in space law calls for special appraisal, but as important, and in the case of the scientific facts vital, considerations within this accepted framework of legal obligation governing international relations generally.⁵⁰¹

However, it is still worth considering the opinions of the scientific community. The main focus will be on ‘minor bodies’ such as asteroids and comets, however it is worth remembering that the space treaties use a fairly sweeping category of ‘other celestial bodies’, the Moon is the only celestial body that is specified in any of the space treaties, furthermore the Moon Agreement was initially going to be limited in application to just the Moon.⁵⁰² There will be a discussion about planets and moon, however their status as ‘celestial bodies’ generates little controversy (with the notable exception of the dwarf planets such as Pluto and Ceres) and therefore needs less attention. The operative question is whether or not ‘asteroids’ are ‘celestial bodies’ within the meaning of the space treaties.

5.4.1 Planets

The planets in our solar system come in two ‘varieties;’ the ‘terrestrial’ inner planets (Mercury, Venus, Earth and Mars) and the ‘giant’ outer planets (Jupiter, Saturn, Uranus and Neptune). All the planets are on roughly the same orbital plane and orbit the sun in the same direction.⁵⁰³ The term ‘planet’ however had never been properly defined⁵⁰⁴, indeed asteroids used to be called ‘minor planets’ however this is now

⁵⁰¹Jenks, *Space Law* (n 34), 183

⁵⁰²Stephan Hobe and Fabio Tronchetti ‘Article 1 (Scope of Application)’ in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl and Peter Stubbe eds., *Cologne Commentary on Space Law*, vol 2 (1st edn, Carl Heymanns Verlag 2013), 35

⁵⁰³David A. Rothery *Planets: A Very Short Introduction* (Oxford University Press 2010), 9-11

⁵⁰⁴*Ibid*, 16

considered to be an outdated term.⁵⁰⁵ Then in 2006, the IAU developed a definition.⁵⁰⁶

The IAU declared:

that a 'planet' is defined as a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.⁵⁰⁷

They also created the concept of a 'dwarf planet':

(2) A "dwarf planet" is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, (c) has not cleared the neighbourhood around its orbit, and (d) is not a satellite.⁵⁰⁸

And that all other objects, with the exception of satellites, "orbiting the Sun shall be referred to collectively as 'Small Solar System Bodies.'"⁵⁰⁹

5.4.2 Moons

First when discussing moons, is the need to differentiate between the Moon and moon(s), the Moon is the one in orbit of the Earth and is specifically mentioned in the space treaties ('outer space, the Moon and other celestial bodies'). The Moon is a substantial body and "if the Moon were to orbit the Sun independently there is no doubt that it would be ranked among the 'terrestrial planets'."⁵¹⁰ The Moon has been called the Moon for as long as it is possible to trace in Germanic languages.⁵¹¹

Moon(s) are "smaller bodies close enough to orbit the planet rather than the Sun."⁵¹²

Or put another way "planets go round the Sun, and moons go round their planets..."⁵¹³

⁵⁰⁵*The Asteroid Hazard* (n 81), 60, 312

⁵⁰⁶Rothery *Planets* (n 503), 16

⁵⁰⁷IAU 2006 General Assembly: Result of the IAU Resolution Votes' (*International Astronomical Union* 24 August 2006) <<https://www.iau.org/news/pressreleases/detail/iau0603/>> accessed 10 January 2020

⁵⁰⁸International Astronomical Union 'Resolution B5: Definition of a Planet in the Solar System' <https://www.iau.org/static/resolutions/Resolution_GA26-5-6.pdf> accessed 10 January 2020

⁵⁰⁹*Ibid*, (3)

⁵¹⁰David A. Rothery *Moons: A Very Short Introduction* (Oxford University Press 2015), 17

⁵¹¹*Ibid*, 17

⁵¹²Rothery *Planets* (n 503), 11-12

⁵¹³Rothery *Moons* (n 510), 15

However, due to the effect of their parent's gravity anything in orbit around a moon is inherently unstable therefore no moon has a moon.⁵¹⁴

There are several broad categories of moons:

Inner moonlets – “mostly less than a few tens of kilometres in radius and irregular in shape. They are closely associated with the planet's ring system and their orbits are circular, lie in the planet's equatorial plane, and have radii less than about three times that of the planet itself.”⁵¹⁵

Large regular satellites – exceed 200 km in radius “which is large enough for their own gravity to have pulled them into near-spherical shapes, a condition described as ‘hydrostatic equilibrium’. Their orbits are only slightly less circular than those of the inner moonlets, and have radii up to twenty or thirty times that of the planet. These too lie pretty close to the planet of the planet's equator.”⁵¹⁶

Irregular satellites – “mostly less than a few tens of kilometres in radius. The term refers both to their irregularity in shape and to their orbits which can be strongly elliptical and are usually considerably inclined relative to the planet's equator. They extend to about 400 times the radius of Jupiter and Saturn, over 800 times the radius of Uranus, and nearly 2,000 times the radius of Neptune.”⁵¹⁷

The origins of moons can be quite diverse and the exact origins of the Moon are still up for debate, there are several theories, the theory of widest acceptance currently is that it formed after the impact of Earth with another body.⁵¹⁸ However, irregular satellites are believed to be fragmented asteroids, small asteroids or comet nuclei and some of Saturn's moons may be remains of a larger moon as may Neptune's moon Nereid. Another of Neptune's moons, Triton, is possibly a captured ‘Kuiper belt object.’⁵¹⁹ Mars has two small rocky irregular moons, they have very low densities

⁵¹⁴*Ibid*, 15-16

⁵¹⁵*Ibid*, 60

⁵¹⁶*Ibid*, 60

⁵¹⁷*Ibid*, 60-61

⁵¹⁸*Ibid*, 42-44

⁵¹⁹*Ibid*, 69, 73-76

and are probably loose ‘rubble piles’ like many asteroids with low densities, they resemble asteroids in spectroscopic analysis.⁵²⁰

In addition to ‘moons’ the gas giants also have ring systems, Saturn’s is the most spectacular however Saturn’s rings as a whole contain less mass than its smallest moon, Mimas. The rings are mostly water ice and are made from “chunks ranging from about one centimetre to five metres in size. Each such chunk is in orbit about the planet. It would be perverse to regard every one of them as a moon, though there is no agreed lower size limit for what can be called a moon.”⁵²¹

While moons do not have moons small solar system bodies do have moons, as of 2015 there are 184 asteroids known to have moons⁵²² and there are various objects beyond Neptune which also have moons.⁵²³ “...only comets are devoid of known moons.”⁵²⁴

5.4.3 Small Solar System Bodies: Asteroids and Comets

After planets and moons are ‘small solar system bodies’ which essentially divide into asteroids and comets, although as will be demonstrated the difference and division between the two is less than absolute. However, as David A. Rothery has written:

Although planetary scientists have come to realize that the boundaries are somewhat blurred, these ‘junk’ objects can be divided into three broad classes: asteroids, trans-Neptunian objects, and comets.⁵²⁵

An asteroid can be defined as “one of the small planetary bodies (also known as minor planets or planetoids) that mainly, but not exclusively, populate the region of the solar system between the orbits of Mars and Jupiter.”⁵²⁶ The first asteroid discovered was Ceres, at first it was assumed to be yet another planet, albeit a small one.⁵²⁷ Ceres is

⁵²⁰*Ibid*, 115-116

⁵²¹*Ibid*, 79-80

⁵²²*Ibid*, 124

⁵²³*Ibid*, 12-13

⁵²⁴*Ibid*, 123

⁵²⁵Rothery *Planets* (n 503), 13

⁵²⁶*The Asteroid Hazard* (n 81), 303

⁵²⁷*Ibid*, 57

now classified as a dwarf planet alongside the likes of Pluto and Eris.⁵²⁸ However, Ceres is also an ‘asteroid.’ Just as Pluto and Eris are also ‘Trans-Neptunian Objects.’⁵²⁹ A comet is a ‘small solar system body’ with a highly eccentric orbit, that goes from periods close to the sun to often far out into the reaches of the solar system. The comet’s core is generally just a chunk of dusty ice only a few kilometres across.⁵³⁰

Comets when:

...approaching the sun to within about the orbit of Mars, may grow one or more tails, that can be tens or hundreds of millions of kilometres long. It will die when its volatiles are exhausted. There are several documented cases of comets whose activity has died, leaving a dark, inert body of asteroidal appearance.⁵³¹

Beyond Neptune, small icy bodies become common, these object form what is known as the ‘Kuiper Belt.’ Together with ‘Scattered Disk’ objects these make up the ‘trans-Neptunian objects’ (TNOs) which have a mass “200 times that of the asteroid belt (one-fifth of an Earth-mass), and in total there may be nearly 100,000 bodies more than 100 kilometres in size.” Pluto and Eris are both ‘Dwarf Planets’ and Trans-Neptunian objects.⁵³²

However, given that the space resources industry, as well as this enquiry, are focusing on asteroids, the asteroids will be the focus of this section. Although it is also worth remembering that astronomical terms themselves are vague and “any small sized body orbiting the Sun could be defined as an asteroid.”⁵³³ Furthermore, the core or nuclei of a comet may over time become what would be classified as an asteroid as it is baked and stripped of its icy exterior by the Sun.⁵³⁴ Indeed, “some near-Earth objects are

⁵²⁸Rothery *Planets* (n 503), 101

⁵²⁹*Ibid*, 16

⁵³⁰*Ibid*, 15

⁵³¹William Napier, ‘Hazards from Comets and Asteroids’ in Nick Bostrom and Milan M. Cirkovic (eds), *Global Catastrophic Risks* (Oxford University Press 2012), 226

⁵³²Rothery *Planets* (n 503), 14-15

⁵³³*The Asteroid Hazard* (n 81), 72

⁵³⁴Lewis *Asteroid Mining 101* (n 83), 32; Rothery *Planets* (n 503), 15

probably defunct comets with remnant water-ice surviving beneath their dusty surfaces.”⁵³⁵

“Asteroids range downwards in size from 950 kilometres across (the diameter of Ceres, the largest example), with no lower limit.”⁵³⁶ While they were once assumed to be the remains of a destroyed planet they are now thought of as having never been part of a planet and the total mass of all asteroids is calculated at being less than a thousandth of the mass of Earth. Most asteroids orbit in the ‘main belt’ between Mars and Jupiter, some do come closer towards the Sun and some do orbit beyond Saturn.⁵³⁷

“Asteroids are not strongly coloured, but can be grouped into several classes according to their reflectance spectrum.”⁵³⁸

There are three main types of asteroids: stony, carbonaceous and metallic; these divide into 24 subtypes of asteroid and 34 subtypes of meteorites. There are several different, overlapping classification systems for asteroids and meteorites, based on different methods of analysis and observation. Asteroid size is determined based on how much sunlight is either absorbed (near-infrared) or reflected (optical) and size only allows us roughly define an asteroids mass given the variation in asteroid density. Further complication is added by the fact that groups of asteroids such as the Near-Earth Asteroids or Trojans etc are identified not by size or composition but the location of their orbit within the solar system.⁵³⁹

A Near Earth Asteroid (NEA) or Near Earth Object (NEO), again highlighting the ambiguity, is one whose orbit is smaller than 1.3 AU.⁵⁴⁰ There are approximately 5000 known NEOs, and their orbital parameters are not constant, NEOs can move over time

⁵³⁵Rothery *Planets* (n 503), 108

⁵³⁶*Ibid*, 13

⁵³⁷*Ibid*, 13-14

⁵³⁸*Ibid*, 103

⁵³⁹Elvis, ‘Prospecting Asteroid Resources’ (n 82), 81-129, 88-98

⁵⁴⁰Shepard, *Asteroids* (n 83), 16

due to the gravitational influence of other solar system bodies.⁵⁴¹ NEOs are primarily asteroids but there are comets among them. There are 20,000 NEOs larger than 100m diameter and over 10 million larger than 20m diameter. Martin Elvis notes that the data available on NEOs and asteroids more generally is very limited.⁵⁴²

Different, overlapping classification systems for asteroids and meteorites, exist. Spectrographic tools are not yet sophisticated or accurate enough to form a clear picture, not for commercial purposes and certainly not to form the basis of a legal regime. NEOs are categorized by orbit not size or composition. Asteroid size is determined based on how much sunlight is either absorbed (near-infrared) or reflected (optical). Size only roughly defines mass given variation in asteroid density.⁵⁴³

Determining an asteroid's size, mass and density, is hard and does not provide a firm enough basis for legal system of classification.⁵⁴⁴ Spectrometric are observations not reliable to commercial standard, for example, Mikael Granvick et al state that M-class asteroids were thought to be primarily Iron (Fe) and Nickel (Ni) but it turns out that they have much more silicate content that was thought⁵⁴⁵

As N.E. Bowles and others state in a recent paper arguing the case for the need for a mission to survey the 'main belt':

Our understanding of the composition of asteroids is still very limited: Broad 'spectral types' are defined based on the shape of spectra, usually in only the visible wavelength range, but only a few thousand of the larger asteroids (from a total population of billions) have been observed. The fundamental connection between these asteroid observations and the laboratory samples we have (meteorites) is approximate and only partially understood.⁵⁴⁶

⁵⁴¹*The Asteroid Hazard* (n 81), 190-197-199

⁵⁴²Elvis, 'How Many Ore-Bearing Asteroids?' (n 101), 20-21

⁵⁴³Elvis, 'Prospecting Asteroid Resources' (n 82), 81-129, 88-98

⁵⁴⁴Mikko Kaasalainen and Josef Durech, 'What's Out There? Asteroid Models for Target Selection and Mission Planning' in Viorel Badescu (eds), *Asteroids: Prospective Energy and Material Resources* (Springer 2013), 131-150; Elvis, 'Prospecting Asteroid Resources' (n 82), 87-88

⁵⁴⁵Mikael Granvick et al, 'Earth's Temporarily-Captured Natural Satellites – The First Steps Towards Utilization of Asteroid Resources' in Viorel Badescu (eds), *Asteroids: Prospective Energy and Material Resources* (Springer 2013), 151

⁵⁴⁶Bowles et al, 'CASTAway' (n 106), 2000

The best way to measure an asteroid mass is sending a spacecraft close to it⁵⁴⁷, and with the exception of the largest asteroids, spacecraft surveys will be the only way to determine composition of asteroid, and to date spacecraft have only visited 12 asteroids. Additionally, more detailed compositional information can be measured from samples, mainly meteorites but also a small amount from sample return missions.⁵⁴⁸ As far as composition is concerned:

The majority of smaller asteroids examined to date show evidence (from morphology, shape and density measurements) of ‘rubble-pile’ structure, although there is a population of asteroids with (partially) differentiated interiors and higher densities.⁵⁴⁹

However, and at least for ‘main belt asteroids’, their ‘parent’ body was probably hot enough to cause enough internal heating to give rise to differentiation which means that the remaining fragments (today’s asteroids) will have different compositions (including metallic iron from the core).⁵⁵⁰

5.5 Legal Definitions

As stated above the treaties fail to provide a definition of the term ‘celestial bodies.’ This has contributed to the lack of a legal definition of the term. Stephan Hobe has suggested that this was in fact deliberate, that the drafters of the treaties deliberately left terms undefined out of a “general fear that too many definitions would bear the risk of the agreement being outdated easily.”⁵⁵¹ However, given the rising interest in asteroid mining from the likes of Deep Space Industries and Planetary Resources, among others, it is now time to provide a clear legal definition of what is and is not a celestial body.

⁵⁴⁷Elvis, ‘How Many Ore-Bearing Asteroids?’ (n 101), 21; Martin Elvis and Thomas Esty, ‘How Many Assay Probes To Find One Ore-Bearing Asteroid?’ (2014) 96 *Acta Astronautica* 227, 227

⁵⁴⁸Bowles et al, ‘CASTAway’ (n 106), 2003-5

⁵⁴⁹*Ibid*, 2005

⁵⁵⁰*Ibid*, 2005

⁵⁵¹Hobe ‘Article 1’ (n 330), 29

Most of the debate has focused on the legal status of outer space and celestial bodies as opposed to providing a definition of the terms. Ernst Fasan was the first to address the question of the definition of celestial bodies but Virgiliu Pop has expanded upon the topic in the greatest detail, Ricky J. Lee has also addressed the issue but Pop remains the leading authority.

5.5.1 Pop's Four Approaches

Pop has argued that there are four approaches to defining celestial bodies. His four approaches are; the 'spatialist approach' which would categorize naturally occurring objects based on their size; the 'control approach' which would categorize an object based on the ability of humans to move it; the 'functionalist approach' would differentiate between objects treated as celestial bodies and those simply being used as moveable orebodies; the 'space object' approach arises out of the discussion of the possibility of converting asteroids into spaceships, and would allow for converted asteroids to be registered as 'space objects.'⁵⁵²

Pop writes that "a spatialist approach would define celestial bodies as objects over a certain size, while objects under that size would not be celestial bodies."⁵⁵³ The issue would then become at what size does something become a celestial body? Pop goes on to argue that in the absence of a natural boundary the law can set a conventional boundary. He uses the analogy of the age of adulthood in support of this proposition, as well as referencing the delimitation between territorial seas and international waters found in the law of the sea. He argues that the law of the sea initially utilized a control approach which eventually evolved into a spatial approach and now utilizes a functionalist approach. He also uses the sea analogy to demonstrate that legally

⁵⁵²Pop, *Who Owns the Moon?* (n 5), 51-57

⁵⁵³*Ibid*, 51

defined boundaries can be moved without destroying the regime, as the sea boundary has shifted from three miles to 12 miles to 200 miles without unduly undermining the law of the sea.⁵⁵⁴ Finally Pop writes that “the spatialist approach has its merits insofar as it distinguishes between small objects- that are not celestial bodies- and big objects, that are celestial bodies. However, the problem still remains to agree on how small is small.”⁵⁵⁵

Pop’s control approach “would distinguish between immovables – celestial bodies – and movables in outer space literally, according to the actual ability of moving them.”⁵⁵⁶ The control approach would mean that if humans can move it then it is a moveable but if it can’t be moved by humans then it is an immovable.⁵⁵⁷

His functionalist approach “would differentiate between objects used in their spatial dimension – these being deemed as celestial bodies or in their material dimension, these being moveable orebodies; or, if used for navigation, they would be space objects.”⁵⁵⁸

His fourth approach is a variation on the functionalist approach and is based on the fact that there have been proposals to use asteroids as ‘spacecraft.’⁵⁵⁹ Indeed, Fasan discussed this too.⁵⁶⁰ Pop argues that any such converted asteroid would most logically be regarded as a ‘space object’ and registered as such, which would only happen under the functional approach.⁵⁶¹ Pop argues that the Registration Convention could allow a state to permit the registration of asteroids as ‘space objects.’⁵⁶²

⁵⁵⁴Pop, *Who Owns the Moon?* (n 5), 51-53

⁵⁵⁵Pop, 'A Celestial Body is a Celestial Body...' (n 5)

⁵⁵⁶Pop, *Who Owns the Moon?* (n 5), 53

⁵⁵⁷*Ibid*, 54-55

⁵⁵⁸*Ibid*, 55

⁵⁵⁹*Ibid*, 55-56

⁵⁶⁰Fasan, ‘Asteroids and other Celestial Bodies’ (n 4), 39-40

⁵⁶¹Pop, *Who Owns the Moon?* (n 5), 55-57

⁵⁶²Pop, 'A Celestial Body is a Celestial Body is a Celestial Body...' (n 5)

However, Pop's four approaches can essentially be reduced to two approaches which provide three options for legal classification; either asteroids and comets are categorized by their size or by their ability to be moved by artificial means. A third option is to state that all are celestial bodies and neither their size nor our ability to move them makes any difference to their legal status.

5.5.2 Size

Categorization based on size would mean that objects over a certain size would fall into the legal category of 'celestial body' and objects below that size would not be classed as 'celestial bodies.' Of course, as has been mentioned above, the debate would then shift to where that line falls. Dr. Ernst Fasan argues that the drafters of the Outer Space Treaty certainly had "substantial natural objects in mind",⁵⁶³ though he gives no indication as to what exactly might constitute 'substantial.' Pop argues that the Outer Space Treaty implies that a celestial body needs to be big enough to land on.⁵⁶⁴ Although, the recent *Rosetta* mission has demonstrated that mass is perhaps more important than raw size in the ability for a spacecraft to land on an object, as it is mass and not size that dictates an object's gravity. The preparatory work of the Outer Space Treaty would certainly support the argument that a celestial body needs to be an object big enough to land on, especially as the Soviets indicated that the main concern of the Outer Space Treaty was 'scientific exploration', meaning that the object in question had to be of a large enough size to make such an endeavour worthwhile.⁵⁶⁵ That said, NASA's *Stardust* mission collected dust particles from a comet's tail, so objects that are worthy of 'scientific exploration' may, in fact, be rather small.

⁵⁶³Fasan, 'Asteroids and other Celestial Bodies' (n 4), 40

⁵⁶⁴Pop, *Who Owns the Moon?* (n 5), 53

⁵⁶⁵UN Doc A/6341 (n 487)

5.5.3 Moveable v Immovable

The other approach to legal categorization would be to base it on the ability for humans to artificially move an object; Virgiliu Pop calls this the ‘control approach’. Pop claims that most scholars fall into the control school.⁵⁶⁶ Indeed in a Draft Resolution of March 15 1964 Working Group Three of the International Institute of Space Law said that “Celestial Bodies in the sense of the treaties and agreements on outer space are natural objects in outer space including their eventual gaseous coronas which can not be artificially moved from their natural orbits.”⁵⁶⁷ However, NASA General Counsel Neil Hosenball rejected the control approach in July 1980 while testifying before the US Senate, as have several others.⁵⁶⁸

The problem with the ‘control approach’ is that it would require an ever shifting and therefore uncertain definition based on technological development. Indeed a recent study determined that it would be possible to move a 500,000 kg asteroid using existing technology⁵⁶⁹ and it may even be possible to move an asteroid by painting it!⁵⁷⁰ This approach would also generate its own questions such as how far does an object need to be moved in order to bring about a change of category? A minor ‘course correction’ is a far different proposition from moving an object from the asteroid belt between Mars and Jupiter and bringing it to Earth orbit.

5.6 A definition of celestial body

This chapter has considered the plain ordinary meaning of celestial bodies, scientific understanding of the term and the planetary science involved, and potential approaches for categorisation proposed by legal scholars. However, the approach that most closely

⁵⁶⁶Pop, *Who Owns the Moon?* (n 5), 54

⁵⁶⁷Fasan, ‘Asteroids and other Celestial Bodies’ (n 4), 40

⁵⁶⁸Pop, *Who Owns the Moon?* (n 5), 55

⁵⁶⁹Brophy, et al, *Asteroid Retrieval Feasibility Study* (n 47), 5,48

⁵⁷⁰Sung Wook Paek, Olivier L. De Weck, and Sangtae Kim, ‘A Multi-Functional Paintball Cloud for Asteroid Deflection’, (2018) 71 JBIS 82

fits within the interpretive framework provided by the VCLT is to regard all naturally occurring objects to be celestial bodies as that term is utilized in the Outer Space Treaty. There is no basis within the ‘plain ordinary meaning’ of the term for differentiation. Further, there is nothing in the drafting history of the treaty to suggest that a specialised definition was intended nor that certain types of solar system body were intended to be exempt from the non-appropriation principle. Finally, with regards to any future space resources governance framework that considers introducing categorization the drafters should bear in mind the limitations of spectrographic analysis and avoid reliance on it at least until further in depth studies of the various ‘small solar system bodies’ can furnish more data.

5.7 Conclusion

The definition of the term ‘celestial body’ is vital to the scope of application of the Outer Space Treaty and the non-appropriation principle. Therefore, it was imperative to examine this. This chapter looked at what space law scholars have already said on the topic, then examined what the space law treaties actually say and examining those terms in light of the *travaux préparatoires*. However, as in line with the VCLT, the main focus was on the ‘ordinary meaning’ of the treaty terms, taking the dictionary definition as a primary guide as to ‘ordinary meaning’. The finding from examining the ‘plain ordinary meaning’ of the term ‘celestial body’ is that it is a broad term that applies to all naturally occurring bodies in the solar system regardless of their size or the ability to be moved by human intervention. Though, as it is sometimes appropriate to consider specialist or scientific definitions of terms, this chapter took a further examination of the scientific definition of the term celestial body. This was particularly useful, even in light of the ‘plain ordinary meaning’ definition as it could be possible for space law to create a new definition or even to categorize celestial bodies in a

future space resources framework. However, the findings of this chapter would suggest that this would not be a prudent course of action. Finally, the chapter examined ‘legal’ approaches to defining or categorizing celestial bodies, building on the work of Fasan and Pop. This essentially boils down to categorizing celestial bodies by virtue of size or their ability to be moved by human intervention. However, the argument ultimately made by this chapter is that celestial bodies as used in the space law treaties apply to all naturally occurring objects in outer space regardless of their ability to be moved by human intervention or their size. Further, it makes the case that regardless of the merits of any future legal categorization of celestial bodies it is premature to do so on the basis of existing planetary science. This may have potentially negative implications for space resource activities undertaken in a certain way particularly on very small celestial bodies (if the ‘resource extraction’ process essentially results in the consumption of the entirety of the body, for example) however it is the conclusion best supported by interpretation of the treaty terms in accordance with the process as laid out by the VCLT.

The next chapter examines the history of the concept of property in order to provide context for the examination in the following chapter of property from a philosophical, legal, and economic standpoint. It is also intended to determine whether there are any alternatives to the existing property paradigm that could prove useful when developing a space resources governance regime within the framework of the Outer Space Treaty given the limitations imposed by Article II OST.

Chapter Six: History of Property

6.1 Introduction

The previous chapter examined the various different potential approaches to defining the term ‘celestial body.’ This is a key term regarding the scope of application of the Outer Space Treaty and Article II OST in particular. The ultimate conclusion of the preceding chapter is that the ‘plain ordinary meaning’ of the term ‘celestial body’ incorporates very naturally occurring physical object in the solar system regardless of size or the ability for it to be moved by human intervention. This means that no body in the solar system falls outside of the non-appropriation principle and subsequently cannot become the private property, in whole or in part, of any State or non-governmental actor. The purpose of this chapter is to examine the history of the concept of property in order to provide context for the examination in the following chapter of property from a philosophical, legal, and economic standpoint. It is also intended to determine whether there are any alternatives to the existing property paradigm that could prove useful when developing a space resources governance regime within the framework of the Outer Space Treaty given the limitations imposed by Article II OST.

Legal scholars tend to start with John Locke when discussing the origins of property. Further, they focus on philosophers (political, legal, and economic) when examining the origins and concept of property. However, as useful as Locke’s ‘state of nature’ theoretical framework is, it is vital to consider the actual history of property particularly within the Western ‘world.’ This serves two primary functions. First, it demonstrates an underlying flaw in numerous philosophical examinations, particularly Locke and other ‘state of nature’ approaches, which is that their history is simply

wrong. Property did not precede the state, indeed property, as a legal phenomenon, requires the state and the law in order to exist. And as John C. Scott has demonstrated the establishment of the state was hardly a voluntary collective of landowners looking to secure their rights but rather coercive, violent and fragile entities dependent upon unfree labour.⁵⁷¹ The actual history of property also provides further support for the ‘bundle’ approach, as the ‘absolute’ model, to the extent that it ever existed, was a short lived, and a ‘recent’ development of the Early Modern era and only becoming the dominant paradigm in the 18th and 19th centuries⁵⁷², although its origins can be directly traced to the developments of the English common law in the 12th century⁵⁷³ and its constituent elements can be found in Roman law.

Further, while there is a focus on property as ‘land,’ it has a broader implication, and indeed in the early English common law, property was predominantly focused on ‘movable’ goods rather than land. This demonstrates a broader application of many of the principles of ‘property’ as a legal institution, as again, this focus, almost exclusively, on ‘land’ is a recent phenomenon. Finally, land is not completely irrelevant to this study. As while space resources may be able to be distinguished from the ‘land’ (celestial body) they are found in, particularly once extracted, space resource activities cannot be. Even if resource activities do not require ownership of the land they are being conducted on, exclusively or at least some form of protected access to an area will be required in order to allow safe operation and provide a degree of security for investment in the operation. As this section makes clear, there are alternative models, particularly from the pre-Modern era which allow for multi and

⁵⁷¹James C. Scott *Against the Grain: A Deep History of the Earliest States* (Yale University Press 2017), 27-28

⁵⁷²Anna di Robilant, ‘A Research Agenda for the History of Property Law in Europe, Inspired by and Dedicated to Marc Poirier’ (2017) 47 Seton Hall L. Rev. 751, 761

⁵⁷³Robert C. Palmer ‘The Origins of Property in England’ (1985) 3 Law and History Review 1, 1-4

variable use of areas with or without ‘ownership’ or ‘appropriation’ of the territory which may prove useful for the future governance of activities in outer space.

This chapter will look at the historical evolution of modern property, from Rome through the ‘invention’ of property in 12th century England to its rise to dominance in the modern era. Roman property law is relevant both because it serves as a foundation for Western property, even that derived from English common law, but also because elements of Roman law exist in international law and the law of outer space. Understanding what Roman law means by the term *res communis*, for example, helps elucidate the difference between describing outer space as *res communis* versus ‘a commons’ in the sense of the English common law.

6.2 Rome

Roman property law “distinguished between land (immovables) and anything else (movables) that could be owned privately.” Regarding moveables they essentially divided between fungibles and non-fungibles. “Fungibles were things that were regarded as existing primarily in quantities (e.g., money, grain) rather than as separate entities. Fungibles are normally consumed through use.” Whereas “non-fungibles were things which had a separate identity and a degree of permanence.”⁵⁷⁴ Though the focus of this section shall be law relating primarily to land. As mentioned, the modern absolute model of property can be traced back to Roman law, specifically the concept of *dominium*

although Roman property was much more complex and diverse that *dominium* would suggest. Absolute *dominium* was only one of the many conceptual building blocks of Roman property, many of which speak to a relative and pluralistic notion of property, but it is the concept that exerted the most lasting impact on generations of modern lawyers.⁵⁷⁵

⁵⁷⁴Andrew Borkowski and Paul du Plessis, *Textbook on Roman Law* (3rd edn, OUP 2005), 156

⁵⁷⁵di Robilant, A Research Agenda for the History of Property Law in Europe’ (n 572), 762-763

Dominium was the ultimate form of property title, roughly or crudely analogous to fee simple in English law.⁵⁷⁶ “Roman *dominium* symbolized the highest and most perfect form of property reserved to Roman citizens and immune from interferences by neighbors and by the state.”⁵⁷⁷

Res refers to the ‘thing’ that comprises the property. Originally *res* simply meant ‘thing’ as in physical object but later it came to mean “any asset that had economic value.”⁵⁷⁸ *Res* were divided into that which could be owned privately and that which was publicly owned, which in turn were subdivided into four different categories.

Res Communes were things enjoyed by all people, this included things like the air, running water, the sea et al. These things were not capable of being owned but there was a legal recognition of a right to use *res communes* and deliberate interference with this right could result “in a delictual remedy of insulting behaviour.”⁵⁷⁹ The second category, *res publicae* refers to those public things which belonged to the state. Such things as perennial rivers although the beds and banks of such rivers could be subject to ownership with the proviso that access to and use of the river itself could not be impeded. *Res Universitatis*, the third category, refers to things that are owned by corporate bodies such as municipalities and colonies (so things like parks and stadiums etc). *Res Nullius* refers to things belonging to no one this was “a heterogeneous category which included wild animals, abandoned property, and ‘divine’ things.”⁵⁸⁰ Things that are *res nullius* may never have been owned before or they may have reverted to that status.⁵⁸¹ Which as it implies means that “certain *res nullius* could fall into private ownership (at which point they ceased to be *res nullius*.) For example,

⁵⁷⁶Borkowski and Plessis, *Textbook on Roman Law* (n 574), 157

⁵⁷⁷di Robilant, A Research Agenda for the History of Property Law in Europe’ (n 572), 761

⁵⁷⁸Borkowski and Plessis, *Textbook on Roman Law* (n 574), 153

⁵⁷⁹*Ibid*, 154

⁵⁸⁰*Ibid*, 154

⁵⁸¹*Ibid*, 182-183

ownership could be acquired over wild animals and abandoned property by *occupatio*.⁵⁸² *Occupatio* means to take possession with the intent to ‘own’ it. This is important because possession (distinct but not unrelated to ownership) in Roman law required both physical possession and a mental element which probably meant “the intention to hold the property as one’s own.”⁵⁸³ Early Roman law seems to have lacked clear concept of ownership. An element of the communal concept of ownership, especially in land, survived throughout the Republican period.⁵⁸⁴

This is important, as while, there are elements of the modern absolute model of property in Roman property law there are clear differences. And there was a recognition of a communal interest in land that would survive into the medieval period but be lost with the transition to the modern absolute private property model. Furthermore, while Roman owners had an unrestricted right to control which includes

the right to use (*ius utendi*), the right to draw fruit (*ius fruendi*), and the right to abuse (*ius abutendi*). The owner has very limited ability to parcel out to other individuals these three entitlements in the way an owner can, for example, in the Anglo-American common law, divide ownership of land between a life tenant and a reversioner. This limited ability makes property a ‘unitary’ or ‘concentrated’ right.⁵⁸⁵

6.3 Medieval Law

Elements of Roman law, which were usually transmitted via the later Imperial legal codes like those of Justinian, would survive and be evident in Medieval property law and thought as will be explored via the developments starting in the 12th century in England.

⁵⁸²*Ibid*, 155

⁵⁸³*Ibid*, 163-164

⁵⁸⁴*Ibid*, 157

⁵⁸⁵di Robilant, ‘A Research Agenda for the History of Property Law in Europe’ (n 572), 763

Medieval property law, such as it was, is characterised by feudalism. While feudal lords are often portrayed as great landowners the relationship was more complex than that and

in flat contradiction with Roman *dominium*, which was unitary, medieval property is a *duplex dominium*. Property is split. Both the lord and the vassal are owners of the fief. The lord has *dominium directum*, or superior ownership, and the vassal has *dominium utile*, or actual use.⁵⁸⁶

Roman or Civil law (the system in operation in much of Western Europe) held that land

had to have a lord who was obliged to guard it, as a father guarded his family, on behalf of his sovereign. In return he could expect to be obeyed by those who lived there and to enjoy their services. This was the matrix of the feudal system. Crucially, these rights of property went with the land rather than existing separately. Should an estate be confiscated, or its inheritance be disputed, the contract of mutual obligation disappeared, and with it the rights of ownership.⁵⁸⁷

Feudalism is about personal relationships and mutual obligations; the lord provides protection and the tenant provides homage.⁵⁸⁸ “Claims to land were claims for the benefit of a personal relationship. Personal relationships and the tenures dependant on them were essentially different from property rights.”⁵⁸⁹

6.4 English Common Law

As a result of the Norman Conquest and subsequent struggles between the Crown and the barons, English law developed differently from most of Western Europe, which remained more feudal in origin. This was not a particularly ‘revolutionary’ change as it was a more evolutionary process which gradually evolved towards the modern understanding of property as expressed through the English common law. The English common law of real property developed and evolved during between 1153 and 1215.

⁵⁸⁶*Ibid*, 764

⁵⁸⁷Andro Linklater *Owning the Earth: The Transforming History of Land Ownership* (Bloomsbury 2015), 30

⁵⁸⁸Palmer ‘The Origins of Property in England’ (n 573), 4

⁵⁸⁹*Ibid*, 5

“The common law gave royal protection to free tenements, replacing feudal relationships as the primary bond structuring society.”⁵⁹⁰ Property was antithetical to the feudal relationship, and only began to appear around 1200⁵⁹¹ (though the term itself has a more complicated story which will be discussed below.) The great inflation of 1180-1220 seems to have been one of the primary causes of the “appearance of property as a legal phenomenon.”⁵⁹² This great inflation seems to have been limited to England and the changes in land management practice that followed also seems to have been limited to England.⁵⁹³

In the legal manual of 1188, it is clear that a tenant’s title was based on a personal relationship between the lord and the tenant. However, by 1220 the rights of the tenant had increased, the ability to ‘divide’ the tenancy between sons for example no longer needed the lord’s approval and disinheritance became a harder, more formal, legal process.⁵⁹⁴

Property, at least in England, was “not an intentional creation.”⁵⁹⁵ It was a subtle but momentous evolution⁵⁹⁶ which developed as a result of negotiations, compromises and political struggle between the lords and the king, but the intention was not the creation of property rather the achievement of specific things, like the restoration of the disinherited after the Anarchy, or to regulate the appointment of successor tenants to smooth the process during a more peaceful age. This rather haphazard process gave rise to litigation to sort it out which increased the role of the courts and the bureaucracy and resulted in a ‘hardening’ of the law.⁵⁹⁷

⁵⁹⁰*Ibid*, 1

⁵⁹¹*Ibid*, 4

⁵⁹²Robert C. Palmer ‘The Economic and Cultural Impact of the Origins of Property: 1180-1220’ (1985) 3 *Law and History Review* 375, 376

⁵⁹³*Ibid*, 380

⁵⁹⁴*Ibid*, 382-384

⁵⁹⁵Palmer ‘The Origins of Property in England’ (n 573), 46

⁵⁹⁶*Ibid*, 8

⁵⁹⁷*Ibid*, 46-47

This was not a deliberate reform nor was it necessarily recognized or recognizable to those at the time, but it is clear that the change occurred, although while land did become more ‘marketable’ there was by no means a large market. However, ‘property’ provided a greater security of tenure; a tenancy that relied on a personal relationship with the lord always carried with it the risk of being revoked, especially if the landholder occupied land ‘owned’ by more than one lord. This made the focus of the tenant on maintaining relations with the lord, whereas property allowed more focus on the development of the land itself. The security of ‘property’ provided a more secure basis for investment in economic development.⁵⁹⁸ “The regulation that secured tenants from lordly supervision and so produced property, produced by the same token greater liquidity of the major economic resources of that society: the land.”⁵⁹⁹ The legal institution of property, and the rule of law, do provide economic benefits, ‘property’ without the legal protection provided by the state is of limited value. It is this security, which provides the economic value. This is part of why it is argued that ‘property,’ particularly over ‘land’ cannot exist in outer space, at least in any meaningful way, as given Article II OST the state has, at best, limited ability to offer that security. Furthermore,

the origins of property demonstrate that law is not merely a reflection of society and social mores. Even at the beginnings of the English legal system, one can discern an interaction between law and mores. While undeniably a major portion of property law derived from social custom, part of the law developed by accident: by acts that had unintended consequences. Such consequences had substantial impact on social life. Law is, after all, bureaucratic force tightly focused on particular aspects of social relationships. From one perspective, the change was precisely the appearance of property. But property was not a ‘mere’ legal phenomenon, an intellectual construct without social relevance. Property, antithetical to feudal relations, determined the existence of power in society.⁶⁰⁰

⁵⁹⁸Palmer ‘The Economic and Cultural Impact of the Origins of Property’ (n 592), 385-386, 388-389

⁵⁹⁹*Ibid*, 395

⁶⁰⁰Palmer ‘The Origins of Property in England’ (n 573), 47

There is an assumption in contemporary analysis that land is central to the paradigm of property, however,

for more than two centuries, the steady development of property doctrines in medieval English common law was completely divorced from disputes concerning the possession of land. It focused instead on controversies about goods and animals. Later, English lawyers in the Tudor era formulated an abstract concept of property and assimilated land to their treatment of goods and animals. At the same time, they wove into their doctrines the strands of a contemporary theological debate about the origins of individual ownership and the role of the state. English lawyers developed and elevated their concept of property to a position of central importance in their thinking.⁶⁰¹

Seipp argues that for almost two centuries, “from 1290 to 1490 English lawyers didn’t use “any single term that had the scope, application and explanatory power that later lawyers found in the words ‘property’ and ‘ownership.’” Before 1280 English common lawyers and jurists used the Latin *proprietas* but when the language shifted to Anglo-Norman French vocabulary changed.⁶⁰² Furthermore when they did speak of ‘property’, which was infrequently, it is clear that they “referred to interests in domestic animals and goods...” This further supports the notion that the primary concern of ‘property’ is rights (interest) and support the ‘bundle approach.’ Furthermore, it is also clear that the basic thinking was different.

One did not say ‘this is my property,’ as we use the term now. Rather, one said ‘I have property in it’ or ‘the property of it is to (or with) me.’ Property was thus a characteristic or attribute (or ‘property’) of a cow or a jewel or a sum of money, not a shorthand referent to the thing itself.⁶⁰³

A later treatise in the 13th century made the distinction between actions focused on property and those focused on possession. There was a preference given to *dominium* not *proprietas*. There was a shift away from treatise to Year Books and there was also

⁶⁰¹David J. Seipp, ‘The Concept of Property in Early Common Law’ (1994) 12 Law and History Review 29, 31

⁶⁰²*Ibid*, 31-33

⁶⁰³*Ibid*, 33

a shift in vocabulary, for example, “instead of paring ‘property’ and ‘possession’ of land, as the treatises had done, Year Book lawyers spoke simply of ‘right’ and ‘possession.’”⁶⁰⁴ This separation between ‘rights’ and ‘possession’ is being resurrected in contemporary property law (as will be discussed in the next chapter) and has a useful relevance with regards to space resource activities. Companies are not looking for ‘territorial possession’ but rather the ‘right to use’ which is clearly not at odds with ‘property’ nor necessarily at odds with the prohibition on ‘appropriation’ in Article II OST.

As Seipp points out this was not simply a change in vocabulary but an important conceptual change. You could have property in goods and animals, but you had ‘right’ over land. This concept could be transposed to outer space, i.e. ‘property’ in extracted ‘ore’ but ‘rights’ over areas of celestial bodies. Writs concerning land were divided into those concerning possession and those concerning right. Under this system right was greater than possession. This is important when considering the social context, as well as the latter shift in the sixteenth century.⁶⁰⁵

Further, under Roman law, at least as transmitted to the medieval lawyer by Justinian, goods and animals were ‘moveables’ and ‘immovable.’ One of the main reasons ‘Year Book lawyers’ discussed ‘property’ was because domestic animals and goods could “stray far from their rightful possessors” either of their own volition (sheep do wander) or not (this was a period of private wars, civil wars and wars between England, Scotland and the Welsh). Therefore, a distinction between land and, goods and animals made sense

a person’s ‘property’ in goods or animals could continue despite the lack of possession, control, or knowledge of their whereabouts. Land, by contrast, remained where one had left it. The identification of the

⁶⁰⁴*Ibid*, 36-37

⁶⁰⁵*Ibid*, 39-40

rightful holder of land was common knowledge to the surrounding population. Goods and animals required notional nametags – ascriptions of ‘property’ to some persons, who might be unknown in the county where the goods or animals were found. Goods could be made and then consumed or destroyed, animals were born and would perish, but the land remained indefinitely. The temporal dimension posed problems for the ascription of ‘property’ to goods and animals.⁶⁰⁶

To put it simply, “chattels could be consumed, destroyed, lost, or hidden. They could be entirely appropriated, rightfully or wrongfully, by a single individual. Land, in an important sense, could not.”⁶⁰⁷ Similar things can be said about space resources, they too can be moved, seized, be consumed or destroyed. Whereas the Moon and, at least the larger celestial bodies, retain the properties of ‘land.’

Furthermore, as has been discussed above, the social context is important; the idea of exclusive, individual ownership would have been an unrecognizable image for landholders in this period. One could have exclusive ownership over a horse or a plow but such a conception of rights over land was not possible; land had multiple, overlapping rightsholders.⁶⁰⁸ Again, there is a similarity with the situation in outer space, exclusive ownership of land is prohibited.

The focus on goods and animals made sense because ‘property’ to the exclusion of others except in cases of leasing or safeguarding was desirable. Furthermore, property was preserved regardless of where the good or animal was and the relation provide the person with the ‘property’ in the good or animal the basis to bring actions in court and to initiate transactions out of court.

In the practical arrangements of life in late medieval England, it was goods and animals, not land, that came closest to what Blackstone would later call ‘that sole and despotic dominion... in total exclusion of the rights of any other individual in the universe.’⁶⁰⁹

⁶⁰⁶*Ibid*, 44

⁶⁰⁷*Ibid*, 45

⁶⁰⁸*Ibid*, 46

⁶⁰⁹*Ibid*, 87

In the fifteenth century the terminology of ‘property’ increased in frequency of use but it is still used in reference to goods and animals not land. Starting in 1490 we see indications “of a universal, abstract notion of ‘property rights’ or a ‘law of property.’” Seipp argues that a conceptional category was emerging that could contain land, goods and animals.⁶¹⁰ It was a broad and abstract terminology and ‘property’ could be found in a growing range of things.⁶¹¹ However it is possible to say that “after 1490, practitioners of English common law began to assimilate their terminology for landholding to their terminology for ownership of goods and animals. There could now be ‘property’ in land and ‘owners’ of land.”⁶¹²

It was in the 16th and 17th century that textbooks and handbooks “brought land and goods under the general rubric of ‘property.’” And in the political debates during this period, including the civil war,

lawyers and laymen alike identified the crucial function of law to be to protect ‘property’ in this broader, more abstract, and more fundamental sense. Out of the legal and political rhetoric of this period came Thomas Hobbes’s and John Locke’s philosophical accounts of property and the settled discourse of the later seventeenth-century lawyers, who regarded a unitary, abstract, more or less absolute property right as a bedrock element of their conceptual structure of law.⁶¹³

It was at this time that “English common lawyers restored most of the familiar terminology of the Romans, making basic conceptual building blocks of ‘public’ and ‘private,’ ‘civil’ and ‘criminal,’ ‘property’ and ‘contract’ law.”⁶¹⁴

From the seventeenth century we can talk more accurately about a general law of property. Social historians have argued that it was the social mobility of ‘new families’ of merchants acquiring land that help change the conception of property. They brought

⁶¹⁰*Ibid*, 33-34

⁶¹¹*Ibid*, 49-50

⁶¹²*Ibid*, 87

⁶¹³*Ibid*, 34

⁶¹⁴*Ibid*, 37-38

ideas about the exclusive ownership of goods and animals into their thinking about their landed ‘property.’⁶¹⁵ And

by writing about property in land and ownership of land, lawyers from the sixteenth century onward invoked a stark mental image of one solitary person alone in complete and exclusive possession of one tract of land. It became possible now for lawyers in England to speak and write about ‘property in general’ with reference at once to land, goods, and animals alike. This was a powerful generalization, destined for enormous impact on law and government, but was one that could not have been uttered while the lawyers’ language about goods and language about land remained separate.⁶¹⁶

6.5 Property Revolution

As mentioned, the modern conception of ‘absolutist’ property developed in the ‘modern era’, with developments starting in the 15th century but more properly the ‘revolution’ occurs in the 16th and 17th centuries. It is linked with the rise of capitalism and a long prevailing view is that “the definition and enforcement of property rights are among the key institutional conditions for markets to work.”⁶¹⁷ This reasoning is part of why the desire for private property rights in space is so great, as private property rights are foundational to the capitalist economic model, and provide a vital security for investment. As Linklater has argued the ‘private property revolution’ began in the early 1500s and transformed the feudal, communal, and mutual obligations of the manorial social contract into a more individualistic modern ‘private’ property model. This model, despite the hardships it meted out on the ‘losers’ of the enclosure movement, enabled society to grow more food and escape the ‘substance’ farming ‘trap’ and laid the foundations for the transformative growth of Western capitalist industrial society. However, we fail to recognize the significance of this revolution

⁶¹⁵*Ibid*, 88-89

⁶¹⁶*Ibid*, 87

⁶¹⁷di Robilant, A Research Agenda for the History of Property Law in Europe’ (n 572), 755

largely because the mindset it established is now so integral to our society, we cannot think outside it.⁶¹⁸

As discussed, feudal rights to land were based on the relationship between lord and tenant, and they were not necessarily individualistic, it was not an exclusive relationship between lord and tenant, there were communal, village rights, not just in things like the village commons (not to be confused with *res communis* which is a different concept) but in the fields; farmers often owned strips or had usage rights which necessitated a community approach to land management and generated rights and obligations to a network of people. This ‘community approach’ would today be regarded as a ‘stewardship’ approach, which is being revived as will be discussed in the next chapter. This took time to disappear, and as Weaver argues never did entirely as “a property right is a relationship between a person and other persons respecting access to material resources.”⁶¹⁹ The word relationship is particularly important in this definition as it “underlines the social and political character of property rights.”⁶²⁰ To put it simply, in order for property rights, especially ‘exclusive’ property rights to work they need to have a societal acceptance and be backed by state power. This, in particular, has relevance for space resources, as it is not sufficient for the US (or any other state) to simply ‘declare’ or ‘recognize’ the property rights of their nationals, in order for those ‘property rights’ to have any value they need be accepted and regarded as legitimate by the international community, otherwise they will have to be defended by raw force.

⁶¹⁸Linklater *Owning the Earth* (n 587), 11-23; di Robilant, A Research Agenda for the History of Property Law in Europe’ (n 572), 757

⁶¹⁹John C. Weaver *The Great Land Rush and the Making of the Modern World, 1650-1900* (McGill-Queen’s University Press 2003), 49

⁶²⁰*Ibid*, 51

Further, while today a capitalist economy essentially translates as free market this has not always been the case and in the 17th century, England and the Netherlands produced competing models of capitalism. England's was a market-based system rooted in private property rights over land, whereas the Netherlands was a mercantilist trading system. This difference can be illustrated by the fact that the Dutch transported an essentially feudal land system to their colonies in North America and Southern Africa in contrast to the English colonies where land could be owned exclusively by settlers.⁶²¹ The developments in the colonies helped to fuel and propel the property rights 'revolution' and 'modern', absolute conception property became the dominant model in the late 18th and 19th century.⁶²²

6.6 Colonial Developments

European colonies, particularly the British 'settler' colonies like the United States, Canada, Australia, New Zealand and South Africa, not only accelerated the development of the modern, absolutist conception of property but extended its reach and impact across the globe. As Weaver says;

A British-born will to possess and improve landed property, enhanced by American innovations, guided the way in which property rights developed in far-flung states, so that by the end of the twentieth century something close to a global convention about private property rights reached out and enfolded items other than land...⁶²³

However, this revolution was a gradual one. Indeed, the original charter for the Mayflower colony was very communal, the Pilgrims would be working in common for the good of the community. There was a religious motivation for this, a desire to return to an early Christian commune type of lifestyle in which all worked for the good of the community not individual profit. However, many of the younger male members

⁶²¹Linklater *Owning the Earth* (n 587), 61-69

⁶²²di Robilant, *A Research Agenda for the History of Property Law in Europe* (n 572), 761

⁶²³Weaver *The Great Land Rush* (n 619), 28

of the group objected to this arrangement once in America and eventually the land was divided up within individual families. As Linklater notes this had the consequence of dividing the community and spreading it out around the bay diminishing the town considerably. Issues relating to property had not been given much initial consideration when establishing the colony, it was intended by its funders as a trading outpost dealing mostly in salt cod and beaver skins and the Pilgrims themselves were mainly concerned with escaping religious persecution and, as mentioned, they wanted to attempt to establish a community on their understanding of an early Christian ideal. As Linklater says, no one involved in the establishment of the colony “thought the ownership of land to be of any importance.”⁶²⁴

Linklater argues that it was the second wave of Pilgrims that really forced the issue over land. The first wave had nothing to lose, they were, for the most part, refugees living in the Netherlands, whereas the second wave were more established people still residing in England and often of comparative means. They wanted to know that they were “braving the dangers and harsh climate” not only to gain the freedom to worship but “to live in a new English society where land could be individually owned.” However, there was question as to whether the principles of land law in English common law could exist in the wilderness of the New World. In a pamphlet published in 1629, well in advance of the writings of John Locke, the notion that private ownership was created by human toil not the law was advanced. These views wove together “Puritan doctrine and the pragmatic outlook of the [enclosure movement]”.⁶²⁵ However, 15th century lawyers had previously debated the labour theory of property rights, particularly over acquisition of things like crops and wild game, so it was not

⁶²⁴Linklater *Owning the Earth* (n 587), 24-25

⁶²⁵*Ibid*, 27

as revolutionary an idea as is sometimes supposed.⁶²⁶ Though in the more exclusive modern system of landholding the notion that someone other than the landowner could have rights in the produce of the land clearly sat less comfortably.

Outside of the New England colonies “the question of how property came into being hardly arose” as

possession of the earth, in both America and the Caribbean, was deemed to be derived from the royal charter that granted the territory to a company or to a powerful proprietor... Every charter detailed how the land was to be owned and administered, and ended with a striking phrase explaining that the monarch had made this happen by ‘our especiall grace, certain knowledge, and mere motion.’ In other words, the king’s royal power, backed by ‘divine grace,’ as the charter also specified, was the ultimate authority that enabled colonists to claim that particular bit of the earth’s surface as their property.⁶²⁷

Once again, there is a clear link between property and the state. Even if the ‘right’ of the States to cede that title was dubious at best, it was clearly accepted and understood that for title to have meaning or economic value it needed to be backed by a ‘sovereign power.’

There was an important political dimension to this debate, which concerned where ultimate political and legal authority lay. For “if property was created by individual effort, and not just by the king’s ‘mere motion,’” then everyone could potentially have the same power and authority as the king, which was a dangerous and revolutionary notion.⁶²⁸ However, government was an important part of the property rights system. The government operated the system of title deeds and enforced it. “Title deeds described how the property had been created and come into the owner’s hands, and any incursion upon it brought the whole panoply of the law against the perpetrator.” Title deeds “recruited the power of government to the side of the property owner.”⁶²⁹

⁶²⁶Seipp, ‘The Concept of Property in Early Common Law’ (n 601), 62-64

⁶²⁷Linklater *Owning the Earth* (n 587), 29

⁶²⁸*Ibid*, 29

⁶²⁹*Ibid*, 34

However, in North America in particular there was a recognition of the need to ‘deal’ with native title; land needed to either be purchased from the natives or ‘won through conquest.’ There was no doubt that European sovereignty was ‘superior’ but, with the exception of Australia, land was not regarded as being *terra nullius*. Indeed, colonial governments often conceded property rights to indigenous tribes but “monopolized sovereignty” and then used that power to take control of native land.⁶³⁰ This reinforces the conceptual link between property and sovereignty.

“English attention to landed property rights differed from that of other colonial powers.” However, all European powers transplanted their property rights regimes into their colonies. The Dutch colonies in New Netherland and South Africa were intended as trading outposts and bases from which to wage war against the Spanish. When settlement was established land was granted on largely feudal terms, although these ‘patroonships’ never really took root. The French in North America established an essentially feudal land holding regime for their sparsely populated colonies with settlers owing labour and military services to the crown. This was done primarily as a method of defending the huge and sparsely populated (at least by Europeans) territory stretching from New Orleans to the Gulf of St Lawrence comparatively cheaply, but it shaped property law in the region, especially as the British in Canada integrated rather than replaced the system once they took over.⁶³¹

English North America had a diversity of land holding systems. Part of this reflected the developments that were happening in England so the colonies represent stages in the ‘property revolution’ of the 17th century (and the political upheavals) but also that the focus of revenue generation for English colonial efforts shifted from commerce to

⁶³⁰Weaver *The Great Land Rush* (n 619), 135-139

⁶³¹*Ibid*, 180-188

land. There was a “relatively early recognition of land as a source of private wealth in the English colonies.” This had not been the initial intention, English settlements, like their Dutch and French counterparts were intended either to be trading outposts (fur) or provide raw materials (trees for the Royal Navy, gold etc) however, “by the 1620s, new-world companies formed in England were failing to make their merchant sponsors rich. Wealth came from raising tobacco, not from the hoped-for discoveries of minerals or from the trade in furs.”⁶³² Which required a different form of land tenure.

“England liberalized land tenure laws by the mid-seventeenth century.”⁶³³ Property law would be gradually simplified in settlement colonies over the next two hundred years. However, the revolution of the seventeenth century primarily came from England rather than the ‘frontier.’ This would not be the pattern in the eighteenth and nineteenth centuries. The ‘frontier’ would drive the evolution and development of property rights. To some extent this makes sense. The ‘frontier’ faced pressures and circumstances that required adaptation. Not least of which was the need to survey ‘new’ lands and delineate property boundaries. One of these innovations was a registry open to public inspection. This innovation helped to develop “private markets in real property and advanced the formation of credit arrangements. Registries reduced uncertainties about property title and allowed land, when presented as collateral for loans, to act as a lever in its own transformation.”⁶³⁴ Registries continue to play an important role in providing information and acting as a form of ‘transparency and confidence building measure’. The Hague Working Group Building Blocks call for the establishment of registry for space resource activities.⁶³⁵

⁶³²*Ibid*, 179-181

⁶³³*Ibid*, 188

⁶³⁴*Ibid*, 238-239

⁶³⁵The Hague Working Group Building Blocks (n 61), Building Block 14

Land registries were first established in Scotland in the 16th century as Scottish law required filing of documents, whereas English common law relied on oral testimony to confirm land holdings. England followed Scotland's lead and established registries in the 18th century to combat fraud. New England colonies usually had land registries but these were initially poorly maintained owing to the lack of experience with such institutions, but they improved. By the late 18th century registries were standard in newly incorporated counties. South Australia was the first to offer government-guaranteed land titles, a system which eventually developed into the Torrens title which was established in 1840.⁶³⁶

Torrens title spread throughout the British colonies and even to the United States; it eventually spread beyond the Anglophone world and was implemented in part of French Africa. Registration and Torrens helped reduce incidences of fraud. "The purpose of registration of property instruments, however, was the same everywhere: it simply put information at the disposal of buyers and lenders." While registration was a form of insurance against bad title it "did not guarantee titles."⁶³⁷

As frontiers congealed into settler societies, reform of property laws in ways designed to decrease this litigation was much desired, but contentious on details. No speculator relished costly lawsuits. The prospect of seeing interests bled white in courtrooms was unnerving. Thus reformation of property rights transpired amid debate and compromise.⁶³⁸

6.7 Conclusion

This chapter has demonstrated that the modern absolute model of property can be traced back to Roman law, specifically the concept of *dominium*. However, while, there are elements of the modern absolute model of property in Roman property law there are clear differences. And there was a recognition of a communal interest in land

⁶³⁶Weaver *The Great Land Rush* (n 619), 239-240

⁶³⁷*Ibid*, 239, 243

⁶³⁸*Ibid*, 69

that would survive into the medieval period but be lost with the transition to the modern absolute private property model.

Medieval property law, such as it was, was characterised by feudalism. While feudal lords are often portrayed as great landowners the relationship was more complex than that. Furthermore, there was a difference between Civil Law and Common Law, differences that were exacerbated by the developments under the English Common Law. Roman or Civil law (the system in operation in much of Western Europe) held that land “had to have a lord who was obliged to guard it...”⁶³⁹ English law developed differently and over time things began to change, gradually evolving towards the modern understanding of property

Feudalism is about personal relationships and mutual obligations; the lord provides protection and the tenant provides homage.⁶⁴⁰ Property was antithetical to the feudal relationship, and only began to appear around 1200.⁶⁴¹ Prior to 1200 it was clear that a tenants title was based on a personal relationship with the lord. However, by 1220 the rights of the tenant had increased.⁶⁴²

Property, as a legal phenomenon, requires an existence not dependent on the strength of the possessor nor on a personal relationship or set of personal relationship it requires that title is “protected by a bureaucratic authority according to set rules. Property derives from the state; it cannot exist prior to the state.”⁶⁴³ Property, at least in England, was “not an intentional creation.”⁶⁴⁴ It was a subtle but momentous evolution.⁶⁴⁵ ‘Property’ provided a greater security of tenure; a tenancy that relied on

⁶³⁹Linklater *Owning the Earth* (n 587), 30

⁶⁴⁰Palmer ‘The Origins of Property in England’ (n 573), 4

⁶⁴¹*Ibid*, 4

⁶⁴²Palmer ‘The Economic and Cultural Impact of the Origins of Property’ (n 592), 382-384

⁶⁴³Palmer ‘The Origins of Property in England’ (n 573), 7

⁶⁴⁴*Ibid*, 46

⁶⁴⁵*Ibid*, 8

a personal relationship with the lord always carried with it the risk of being revoked, especially if the landholder occupied land ‘owned’ by more than one lord.

It is also important to recognize that the conception of property changed. In the medieval period property meant goods and animals. You had rights over land but you had property in goods and animals.⁶⁴⁶ Part of this was the nature of the ‘thing’ in question, goods and animals could be destroyed, requiring compensation to ‘restore’ damages but land could not be destroyed in the same sense and therefore ‘possession’ could be restored to the ‘rightful’ tenant.⁶⁴⁷

As discussed, a conceptual change occurred around the 15th century which saw a broadening of the conception of ‘property’ to include land. And in the period surrounding the English Civil War a growing sense that the “crucial function of the law” was to protect ‘property’ in this new, broader conception.⁶⁴⁸ From the 17th century we can talk more accurately about a general law of property. Social historians have argued that it was the social mobility of ‘new families’ of merchants acquiring land that help change the conception of property. They brought ideas about the exclusive ownership of goods and animals into their thinking about their landed ‘property.’⁶⁴⁹

This led to the ‘private property revolution’ which transformed the feudal, communal, mutual obligations social contract of the manor to a more individualistic modern ‘private’ property model, however we fail to recognize the significance of this revolution largely because the mindset it established is now integral to our society.⁶⁵⁰

This revolution then led to the emergence of capitalism as it enabled landholders to

⁶⁴⁶Seipp, ‘The Concept of Property in Early Common Law’ (n 601), 39-40

⁶⁴⁷*Ibid*, 45

⁶⁴⁸*Ibid*, 33-34

⁶⁴⁹*Ibid*, 88-89

⁶⁵⁰Linklater *Owning the Earth* (n 587), 11-23

capitalize their landholdings.⁶⁵¹ While the ‘revolution’ lead to a more individualised conception of property rights the relational aspect never fully disappeared, as “a property right is a relationship between a person and other persons respecting access to material resources.”⁶⁵² To put it simply, in order for property rights, especially ‘exclusive’ property rights to work they need to have a societal acceptance and be backed by state power.

European colonies, particularly the British ‘settler’ colonies like the United States, Canada, Australia, New Zealand and South Africa, not only accelerated developments of modern, absolutist property but extended their reach and impact across the globe. The next chapter will examine ‘property theory’ as a political, legal, and economic concept.

⁶⁵¹di Robilant, A Research Agenda for the History of Property Law in Europe’ (n 572), 757

⁶⁵²Weaver *The Great Land Rush* (n 619), 49

Chapter Seven: Property Theory

7.1 Introduction

The previous chapter examined the history of property in the Western tradition. It examined the development of the concept from Roman law to the development under the English common law and then the property ‘revolution’ of the 17th century when the modern concept of property began to emerge as well as the further development that were undertaken as the Western conception (specifically the Anglo-American) conception of property pushed into and beyond the frontiers of European settlement. It demonstrated that property is not a static concept but one that has developed and evolved as societal changes have pushed it. Further, it demonstrated that property is a product of the state and law and can therefore be shaped by it. This chapter will examine property through a more theoretical lens as undertaken by political, legal, and economic theorists. Following on from this theoretical discussion of the nature of property is a discussion of the role of the state in relation to property. The chapter finishes with a discussion of some alternative conceptions of property.

This chapter has three key, essential arguments. It makes the case that property is an evolving, complex concept which has historical and societal context. There is no one definition of ‘property’, it is not a static or fixed concept. Further, property is a product of society and ultimately government, even in a Lockean state. Property is intertwined with the existence and authority of the state, it is a political creation. Finally, property is ultimately about distribution of resources, it is a mechanism for controlling access to, and use of, various resources be it gold, land or deposits of water ice on far flung asteroids.

The nature of property, essentially ‘what it is’, how it works, and the role of the state in its creation, protection, and enforcement is at the heart of this enquiry. If property is a ‘natural right’ acquired through the application of ‘labour’ to an object then there is potentially little issue with companies acquiring ‘property rights’ over extracted resources from celestial bodies. If however the State is required to assign title, then there will be significant issues with Article II of the Outer Space Treaty. There is, of course, a spectrum between these two extremes and there are potential alternative models of ‘resource management’ that will be explored in this chapter.

This chapter will examine and dismiss the ‘Lockean’ approach to property rights, arguing for a positivist or ‘bundle of rights’ approach to understanding the nature of property. It also places the State at the centre of ‘property’, vital for its creation, protection and enforcement. The latter is argued to be particularly important as property rights that cannot be enforced are practically worthless. Yet such enforcement is challenging under the structure of the Outer Space Treaty, at least without some form of international framework. This chapter therefore supports one of the overarching conclusions of this work that while not required by the Outer Space Treaty there will need to be an international framework on space resource governance. Finally, this chapter discusses some of the alternatives to the dominant paradigm of property, particularly notions of ‘stewardship’ which in addition to doing a better job of adhering to the ‘interests and benefits’ aspect of Article I of the Outer Space Treaty would also help to alleviate some of the concerns expressed by the likes of Elvis about the long term sustainability of space resources.

The first section of the chapter will discuss the common notion that property is a ‘thing’ and that this view is mistaken, though popular. It will reframe the nature of property as about ‘rights’ and relations between individuals regarding ‘things.’ The

next section will look at the natural school of property, as exemplified by the work of John Locke. It will dismiss this approach to property rights; however, it is vital to examine it given the influence of Locke in Anglo-American thinking and the ‘Lockean’ reasoning expressed in the US space resources legislation of 2015. The following section will focus on the ‘bundle of rights’ approach which is the dominant paradigm in modern legal scholarship. It will focus on the elements of ‘exclusion’ and ‘use’ while questioning whether or not they are equal. The next section Will look more explicitly at the relationship between property and the state, particularly its nature as an institution for managing the distribution and use of resources and the societal context it has as a result. The following section will discuss the role of enforcement and the rule of law which is not only vital in order for property rights to have any practical or economic meaning but also one of the main potential hurdles regarding space resources. This, as mentioned, will help to reinforce the argument that it is necessary, practically if not legally speaking, for there to be an international space resources governance framework in order to effectively enforce property rights. Finally, alternatives to the mainstream approaches to property will be discussed, from Proudhon, who ‘famously’ declared that ‘property is theft’⁶⁵³ to Elinor Ostrom’s ‘common pool resources’, and the notion of stewardship.

7.2 Property as a ‘thing’

According to Proudhon, “property is theft”⁶⁵⁴; according to Kevin Gray, property is an illusion⁶⁵⁵; and according to Laura Underkuffler, “property is seen as a bulwark which protects material wealth, liberty, and autonomy.”⁶⁵⁶ Property is fairly central to our economic system and even our political life. That said, it is ill defined and

⁶⁵³Proudhon *What is Property?* (n 70), 13

⁶⁵⁴*Ibid*, 13

⁶⁵⁵Gray, ‘Property in Thin Air’ (n 36), 252

⁶⁵⁶Laura S. Underkuffler, *The Idea of Property: Its Meaning and Power* (OUP 2003), 1-2

understood. The basic underlying issue is whether property is a right or a thing. The property as a ‘thing’ idea is the prevalent popular conception of how property works i.e. my car is my property. Most people do not think of the title or the deed to their car or house as being their property but rather the ‘object’ of ownership itself. The property as a ‘thing’ concept dates back to Roman law, originally *res* simply meant ‘thing’ as in a physical object, however it later came to mean “any asset that had economic value.”⁶⁵⁷ This difference is important. In a true ‘state of nature’ situation ‘property’ does not matter, possession is key (and might makes right.) It is society and its embodiment in the state that makes property meaningful, that allows it to have economic and practical value (as discussed in the last chapter ‘property’ did not emerge in post-conquest England until the rule of law had been (re)-established in the 12th century.) This context is vital, as Underkuffler has written:

The idea of a man’s coconuts being his property makes no sense if he is stranded, irrevocably, on an uninhabited island; property has meaning only when human relations, or conflicting claims among people, are at stake. Furthermore, the idea of ‘property as things’ assumes a model of ownership... that involves a kind of complete freedom of individual choice regarding use, exclusion, and transfer that is (in fact) rarely conferred by law. Thus, although the idea of property as ‘things’ commands great cultural and rhetorical power, it fails to reflect the rich meanings of property in social discourse and law.⁶⁵⁸

Modern legal scholarship takes the view that property is about rights between people in relation to ‘things’, and therefore ‘property’ is a grouping or constellation of elements and rights. However, it is still worth considering the natural law school, especially as grounded in the work of John Locke, especially given the prevalence of ‘labour theory’ particularly among the rather vocal ‘libertarian’ section of the US space community.⁶⁵⁹ This will be explored in the next section.

⁶⁵⁷Borkowski and Plessis, *Textbook on Roman Law* (n 574), 153

⁶⁵⁸Underkuffler, *The Idea of Property* (n 656), 11-12

⁶⁵⁹Gangale, *The Development of Outer Space* (n 8), 4-5, 202, 213

7.3 John Locke and Property as a Natural Right

Probably the most prominent writer in the ‘property is a natural right camp’ is John Locke. In Locke’s view God gave the world to all humans as common property.⁶⁶⁰ However the key point is that this was the case in the state of nature, which while for Locke was not Hobbes’ hellish state of constant warfare, was a primitive era in human nature logically surpassed by the modern age of states and political society (Native Americans were, in Locke’s view, living in a state of nature, at least prior to the arrival of Europeans.) Locke also made the case, now known as the ‘labour theory of property rights’ that it was the act of labour by man to acquire an object that gave rise to his rights over that object. However this only applied to that which he is able to use, without waste.⁶⁶¹ Locke recognized that this had its disadvantages, and that the generally lawless state of nature meant that one would have to be constantly on guard against those who would want to take this property, and that in the end, man decided to come together to create a society in order to preserve and regulate property.⁶⁶² Although, as argued in the previous chapter, this view has little basis in historical reality.

John Locke has had the biggest individual impact on property theory, at least in the English-speaking world.⁶⁶³ This combined with his use by those who argue that the state is not necessary for the existence of property, particularly within the ‘space libertarian’ community,⁶⁶⁴ make his thoughts on property worth examining in greater detail. It is logical to examine the work of the man himself before moving on to what

⁶⁶⁰John Locke, Peter Laslett (eds) *Two Treatises of Government* (Student Edition, CUP 1988), 285-286

⁶⁶¹*Ibid*, 288-290, 294, 299

⁶⁶²*Ibid*, 323-326, 348, 355, 360-361

⁶⁶³Alexander and Peñalver, *An Introduction to Property Theory* (n 388), 35

⁶⁶⁴Gangale, *The Development of Outer Space* (n 8), 4-5, 202, 213

scholars have to say about his work. Unsurprisingly given his stature, there is considerable writing about Locke's theories on property.

In Locke's view God gave the world to all humanity as common property, i.e. in state of nature the world is a commons.⁶⁶⁵ However, it is important to note that as Margaret Davies points out Locke's commons was not exactly what we mean by the term today, she says that:

In the Christian world inhabited by Locke the commons were a gift from God, available to all in the state of nature, but ultimately to be used for the benefit and prosperity of 'mankind'... Locke's 'commons' were somewhat akin to an unlimited realm where everything was *res* or *terra nullius*. It was not a protected public domain, nor a limited commons, since objects could be removed from the commons without the consent or even the participation of other 'commoners.'⁶⁶⁶

In this state of nature one was free to take as much property they are able to use or enjoy without it going to waste or spoiling.⁶⁶⁷ In Locke's famous words "whatsoever then he removes out of the State that Nature has provided and left it in, he hath mixed his Labour with, and joined to it something that is his own, and thereby makes it his property."⁶⁶⁸ This does not require the consent or assignation of anybody else, simply the application of honest labour.⁶⁶⁹ However, Locke recognized that in the state of nature, in the absence of any government, one was also powerless to protect one's property without the use of vigilance and force, so the property owner would have to be constantly on guard against those who would take their property by force. This is why humans created society or the state. Or in the words of Locke: "The great end of Man's entering into society, being the enjoyment of their Properties in Peace and Safety, and the great instrument and means of that being the Laws established in that

⁶⁶⁵Locke, *Two Treatises of Government* (n 660), 285-286

⁶⁶⁶Davies, *Property* (n 41), 88

⁶⁶⁷Locke, *Two Treatises of Government* (n 660), 290

⁶⁶⁸*Ibid*, 288

⁶⁶⁹*Ibid*, 170, 289, 294, 299

Society.”⁶⁷⁰ This was a point he made repeatedly throughout his *Second Treaties*, that the key role or end of political or civil society (by which he essentially meant the state) was the protection and regulation of property.⁶⁷¹ He even went so far as to say that without the protection of the state, property has little value; “for I have truly no Property in that, which another can by right take from me, when he pleases, against my consent.”⁶⁷²

Matthew Kramer holds that Locke’s error is assuming that in state of nature people need ownership of goods to enjoy them. As Kramer explains “people in the state of nature could readily survive without owning any goods, so long as they all had privileges to use and consume the goods.”⁶⁷³ Indeed, as Scott has demonstrated ‘cities’ or settled communities existed before the state, which was hardly the provider of security as asserted by Locke.⁶⁷⁴ Further, Kramer argues that Locke demonstrates quite clearly that there can be the right to use something without needing ownership rights over that thing. He says that the principle drawback of the state of nature was the insecurity of persons and holdings not the absence of the right or ability to use items.⁶⁷⁵ One criticism that Kramer makes of Locke’s labour theory of property rights is that it assumes that individuals are wholly responsible for their exploits, talents and achievements.⁶⁷⁶ However, Kramer retorts that

at least in principle the Lockean Theory can provide for the collective shaping of skills and goods, by insisting only that everyone should garner reward in line with what he or she has contributed to societal welfare through the employment of his or her productive capabilities.⁶⁷⁷

⁶⁷⁰*Ibid*, 355

⁶⁷¹*Ibid*, 268, 323-326, 348, 360

⁶⁷²*Ibid*, 360-361

⁶⁷³ Matthew H. Kramer, *John Locke and the Origins of Private Property: Philosophical Explorations of Individualism, Community, and Equality* (CUP 1997), 114-115

⁶⁷⁴ Scott *Against the Grain* (571), 3-7, 24-28

⁶⁷⁵ Kramer, *John Locke and the Origins of Private Property* (n 673), 115, 120-121

⁶⁷⁶*Ibid*, 140-141

⁶⁷⁷*Ibid*, 142

However, Locke concluded all lawful acts of appropriation to be acts giving rise to rights of ownership⁶⁷⁸ or as Margaret Davies puts it “in Locke’s state of nature the world was, to be blunt, up for grabs – as long as it was grabbed in the right way.”⁶⁷⁹

And in a manner that would be used as a justification for European imperialism, Locke

argued that land and resources which were not used, or not sufficiently used, could legitimately be appropriated for the benefit of humankind. Such an appropriation was effected by labour, and did not rely on anybody’s consent. As formulated by Locke, this argument only applied in the state of nature. It did not apply to areas of the world, such as Europe, which had gone beyond this state of nature and where property ownership was governed by positive law.⁶⁸⁰

As Jeremy Waldron has written “in Locke’s system, property was generated by the unilateral action of appropriators and cultivators approaching unowned resources without any authorisation.”⁶⁸¹

Unlike Hobbes, Locke does not feel that the state of nature is synonymous with a state of war. However, war is bound to be more common in the state of nature.⁶⁸² Waldron argues that it is this logic that causes Locke to argue that this is why man enters into society, i.e. creates government, to preserve not create property. However, Waldron does not agree with Locke’s explanation of the origin of property. He feels unable to accept the removal of the state from the equation in that way.⁶⁸³ He says that “Locke’s theory has it that property rights in their origin are independent of government and law.”⁶⁸⁴ But goes on to say that “there is no getting away from the fact that property rights are entangled in public legislation.”⁶⁸⁵ Waldron is not alone in this line of thinking, and as demonstrated, the historical record undermines Locke’s case. Further

⁶⁷⁸*Ibid*, 111

⁶⁷⁹Davies, *Property* (n 41), 88

⁶⁸⁰*Ibid*, 93-94

⁶⁸¹Jeremy Waldron, *The Rule of Law and the Measure of Property* (CUP 2012), 26

⁶⁸²Peter Laslett, “The Social and Political Theory of *Two Treatise of Government*” in John Locke, Peter Laslett (eds) *Two Treatises of Government* (Student Edition CUP 1988), 93-122, 99

⁶⁸³Waldron, *The Rule of Law* (n 681), 26-34

⁶⁸⁴*Ibid*, 28

⁶⁸⁵*Ibid*, 34

as Peter Laslett says that Locke's case is that the development of property led men from state of nature to government in order to preserve and protect that property which they had acquired through their labour.⁶⁸⁶ He goes on to say that according to Locke "property, both in the narrow and in the extended sense, is insufficiently protected and inadequately regulated in the state of nature and this is the critical inconvenience which induces men to 'enter into society...'"⁶⁸⁷ And Sandra F. Joireman has said that John Locke viewed "property rights as intertwined with the existence of the political community. For Locke, the presentation of property is the "chief end" of the formation of the state..."⁶⁸⁸ Furthermore, Locke acknowledged that nature of acquisition of property rights would change once man entered 'society.'⁶⁸⁹ Therefore, perhaps a revaluation of Locke is in order, instead of the libertarian that he is so often perceived as being these days (because he argues that property is a natural right that does not need the state to exist), he in fact takes the classical liberal position that the reason for the state is to protect property. This is an important distinction. Even if we accept that property rights can exist independently of the state, they need the state to have any value. Without security and certainty property rights are worthless, as will be elaborated upon below.

Indeed, the state which was probably more impacted by the thinking of John Locke than any other was founded by people who generally agreed that while God had wanted man to form a political society (i.e. the ancient Kings of Israel etc) they, influenced heavily by John Locke, believed that the purpose of political society was

⁶⁸⁶Laslett, "The Social and Political Theory..." (n 682), 93-122, 101-102

⁶⁸⁷*Ibid*, 93-122, 104

⁶⁸⁸Sandra F. Joireman, *Where There is No Government: Enforcing Property Rights in Common Law Africa* (OUP 2011), 6

⁶⁸⁹Kramer, *John Locke and the Origins of Private Property* (n 673), 144

“the preservation and regulation property. It had been formed by agreement or compact among property owners for these purposes.”⁶⁹⁰

As mentioned, Locke is important, as is the ‘natural school’ of property rights for which is serves as the standard bearer. He cannot be ignored, particularly given his influence in the US. Indeed, the influence of his thinking can be detected in the US space resources legislation, the formulation in which the act of ‘obtaining’ a space resource ‘entitles’ a US citizen to that resource, is clearly an application of Locke’s ‘labour theory’.⁶⁹¹ However, as explored in this section there are several issues with Locke. First, outer space is not in ‘the state of nature.’ Human activities in outer space are subject to international law, this has certainly been the case since the enactment of the Outer Space Treaty in 1967 but a clear case can be made for this being the situation since at least UNGA Resolution 1962. Further, Article VI of the Outer Space Treaty requires States to exercise jurisdiction over their nationals in outer space. Outer Space, therefore, is clearly not outside the scope of the ‘State’, ‘society’, or the law, and thus cannot be considered as being in the ‘state of nature.’ As demonstrated above, Locke’s labour theory only applied in that circumstance. Further, Locke’s conception of the development of property is simply not supported by the historical record. The state preceded property and property relies on state and its enforcement mechanisms (and the effective rule of law) in order to have any economic or practical value. Finally, Locke himself recognizes the importance of the state in providing this value. Locke is influential, but positivism or the ‘bundle of rights’ school of property theory provides a much better framework for understanding the origin and nature of property and is

⁶⁹⁰Robert Middlekauff, *The Glorious Cause: The American Revolution, 1763-1789* (2nd edn OUP 2005), 122-123

⁶⁹¹CSLCA (N 48), §51303

more compatible with the Outer Space Treaty. This will be examined in the next section.

7.4 Positive Property or Bundle of Rights

Property is a fundamental concept to both society and the economy, furthermore “perhaps more than any other fundamental legal concept, the notion of property invites contention.”⁶⁹² Numerous scholars agree that property is a relationship between people in relation to an ‘object’, there is also fairly board agreement amongst modern legal scholars of property that it is comprised of multiple elements or ‘bundles’. Alexander and Peñalver say that property is not about a person’s relationship to a thing but about the rights people have against each other in relation to a thing.⁶⁹³ Kevin Gray and Susan Francis Gray have written that “property is not a thing but a power relationship... a power relationship of social and legal legitimacy existing between a person and a valued resource.”⁶⁹⁴ Macpherson says that what is commonly referred to as property generally means a thing, but in law it really means title, the exclusive right to a thing.⁶⁹⁵ Margaret Davies wrote that “property is not an object at all, but rather a legally defined relationship between persons with respect to an object.”⁶⁹⁶ Svetozar Pejovich says that “property rights are relations among men that arise from the existence of scarce goods and pertain to their use.”⁶⁹⁷ J.E. Penner said that “property is pictured as a bundle of different rights, such as the right to consume, the right to destroy, the right to manage, the right to give, the right to lend, the right to sell, and so on.”⁶⁹⁸ John Christman says that “private liberal ownership amounts to the enforcement of individual rights to use,

⁶⁹²Kevin Gray and Susan Francis Gray, *Land Law* (7th edn, OUP 2011), 30

⁶⁹³Alexander and Peñalver, *An Introduction to Property Theory* (n 388), 2

⁶⁹⁴Gray, *Land Law* (n 692), 32

⁶⁹⁵Macpherson, ‘The Meaning of Property’ (n 388), 6-7

⁶⁹⁶Davies, *Property* (n 41), 13

⁶⁹⁷Svetozar Pejovich, *The Economics of Property Rights: Towards a Theory of Comparative Systems* (Kluwer Academic Publishers 1990), 27

⁶⁹⁸J.E. Penner *The Idea of Property in Law* (CUP 1997), 1-2

posses, destroy, transfer, and gain income from goods.”⁶⁹⁹ As Jeremy Waldron says the modern view of property is as ‘bundle of rights’ and this is dominant paradigm.⁷⁰⁰ As indicated, there is broad support for viewing property as a ‘bundle of rights’, however there is debate over the constituent elements of this bundle. Gregory S. Alexander and Eduardo M. Peñalver, in their book *An Introduction to Property Theory* list the essential elements of the bundle as including:

the right to possess (which includes the right to exclude), the right to use, the right to manage, the right to the income a thing generates, the right to the capital (i.e., the thing itself), the right to security, the right to transmissibility and the absence of term (potentially infinite duration), the duty to prevent harm, the liability to execution (e.g. to satisfy a debt), and the incident of *residuality* (the idea that, when lesser interests come to an end, the full interest in the property reverts to the owner).⁷⁰¹

The core components of the ‘bundle’ particularly concerning space resources are the right to exclude and the right to use. Essentially these two ‘core’ sticks of the ‘bundle’ are about control over who and how the resource is used. It is this control over how the resource is used which distinguishes “property entitlement from other species of right recognized by law.”⁷⁰²

7.4.1 Right to Exclude

That the right to exclude is fundamental to the concept of property is a widely held position among scholars of property law. And Morris Cohen says that “the essence of private property is always the right to exclude others.”⁷⁰³ Cohen also argues that there is not any guarantee that one can actually use their property but that the right to exclude others from using them is the key. He says specifically that “the law does not guarantee

⁶⁹⁹John Christman, *The Myth of Property: Toward and Egalitarian Theory of Ownership* (OUP 1994), 6

⁷⁰⁰Waldron, *The Rule of Law* (n 681), 66

⁷⁰¹Alexander and Peñalver, *An Introduction to Property Theory* (n 388), 4

⁷⁰²Gray, *Land Law* (n 692), 48-49

⁷⁰³Morris Cohen, ‘Property and Sovereignty’ in C.B. Macpherson, eds., *Property: Mainstream and Critical Positions* (University of Toronto Press 1978), 159

me the physical or social ability of actually using what it calls mine... But the law of property helps me directly only to exclude others from using the things that it assigns to me.”⁷⁰⁴ However it is worth noting that the absolute nature of the right to exclude, if it ever existed, has certainly diminished over time and now a wider and societal consideration needs to be taken.⁷⁰⁵ The right to exclude is perhaps the biggest single issue with the notion of ‘property rights’ in outer space, as the right to exclude flies squarely in the face of Articles I and II of the Outer Space Treaty. That said, you can have right to use without the right to exclude. However, use by its very nature often involves exclusion; Penner uses the example of a library book, while in use by one library patron other library patrons are excluded from using it for as long as the first patron retains the book.⁷⁰⁶ Of course, this is a potential issue for space resources as the ‘use’ of the space resource will generally render it permanently unusable by other parties. Further, Penner argues that the idea that property is the right to exclude others is a misconception, he says that the right to property is more of a general duty on others “to exclude themselves from the property of others.”⁷⁰⁷ As Penner argues, there is no interest for anyone in preventing the use of a resource⁷⁰⁸, it is about selective control, choosing who to exclude and who to let use the item. While exclusion is an important aspect of property, however without the right to actually use the resource property has limited, if any value.

7.4.2 Right to Use

Margaret Davis has written that “*intrinsic* to the existence of private property is the power to control the object.”⁷⁰⁹ An important part of that is controlling who and how

⁷⁰⁴*Ibid*, 159

⁷⁰⁵Gray, *Land Law* (n 692), 35

⁷⁰⁶Penner *The Idea of Property in Law* (n 698), 68-69

⁷⁰⁷J.E. Penner, ‘The Bundle of Rights Picture of Property’ (1996) 43 UCLA L. Rev. 711, 743-744

⁷⁰⁸Penner *The Idea of Property in Law* (n 698), 70

⁷⁰⁹Davies, *Property* (n 41), 52

it is used. As Kevin and Susan Francis Gray have said, that the owner is entitled to determine how to use the resource; it is this control which “distinguish property entitlement from other species of right recognized by law.”⁷¹⁰

‘Use’ can mean an active engagement with an object but there is also a broader meaning of ‘use’. “In this broad sense ‘use’ refers to a disposition one can make of something that is purposeful and can be interfered with by others.” This broader definition does not require continual engagement as long as future engagement is planned or considered. Long term interests make the broad definition of ‘use’ the most appropriate one to use.⁷¹¹ This is particularly important for space resources, especially on asteroids, as given the nature of orbits, there may be significant periods of ‘disengagement’ from the ‘use’ of a site for resource extraction while future operations are still planned.

That there is a right to use one’s property is logical. However, this is not an unlimited or unconstrained right. There are environmental protection rules that, for example, limit the ways in which a farmer can use her fields or heritage protection rules that limit the colour a homeowner can paint their 16th century home. Furthermore, use is not an exclusive right of the owner, nor does use give rise to ownership. Borrowing a wheelbarrow does not transfer ownership, using a swing in a municipal park does not make it yours, even eating an apple, though destruction is the ultimate form of appropriation,⁷¹² does not render the apple yours. A right to use is certainly part of property, though as mentioned not an absolute right, but it also, on its own does not indicate the existence of property, in this sense the right to exclude is the stronger ‘stick.’

⁷¹⁰Gray, *Land Law* (n 692), 49

⁷¹¹Penner *The Idea of Property in Law* (n 698), 70-71

⁷¹²Fasan, ‘Asteroids and other Celestial Bodies’ (n 4), 39

7.4.3 Are All Sticks Equal?

However, as Underkuffler points out there is a problem with the ‘bundle’ theory as it is unclear if something is property because of those elements or whether because it is property it therefore gives rise to those rights. She argues that it is possible to take a results-based approach, i.e. a property rights regime is supposed to advance individual liberty or promote human flourishing. This approach would impact what is included on the ‘list’ of elements of the bundle.⁷¹³ Further, there is a question of hierarchy, as Underkuffler argues

The rights to use, possess, exclude, devise, and so on are often cited as usual incidents of corporeal property ownership. Because these rights are almost always described in the same breath, one might expect that they are equally held and equally protected.⁷¹⁴

However, she argues that this is not the case, that there is actually a hierarchical ordering, with the right to exclude being considered the highest ranked and most essential. The right to use and the right to sell are considered less important and therefore have been given less protection.⁷¹⁵

However, Penner takes issue with the centrality of the exclusive use of property. He argues that property “must involve more than a right to the exclusive use of a thing.”⁷¹⁶

However he recognizes that exclusivity is vital to the interest in property but it is about the exclusion of the determination of the use of the thing.⁷¹⁷ Penner argues that

the right to property is the right to determine the use or disposition of an alienable thing in so far as that can be achieved or aided by others excluding themselves from it, and includes the right to abandon it, to share it, to license it to others (either exclusively or not), and to give it to others in its entirety.⁷¹⁸

⁷¹³Underkuffler, *The Idea of Property* (n 656), 12-14

⁷¹⁴*Ibid*, 25

⁷¹⁵*Ibid*, 25-26

⁷¹⁶Penner, ‘The Bundle of Rights Picture of Property’ (n 707), 742

⁷¹⁷Penner *The Idea of Property in Law* (698), 49-50

⁷¹⁸Penner, ‘The Bundle of Rights Picture of Property’ (n 707), 742

He argues that property is not necessarily about excluding everyone, but about controlling who we share with. He uses the example of a bottle of wine to illustrate the point, arguing that we do not share a bottle of wine with everyone but with a few select people. For Penner, use “justifies the right” while exclusion is more about a practical aspect that might also be formulated as ‘non-interference’. However, “the basic idea is that non-owners of the property in question may not trespass, handle, damage, or destroy the property...”⁷¹⁹

7.5 Property and the State

That property and the state are intertwined is clear. Indeed, for ‘ancient’ philosophers it was often part of the foundational nature of the State. For Rousseau the state is established “only in order to provide security for private property...”⁷²⁰ Locke takes a similar view, in the state of nature labour gives rise to ‘property’ over resources⁷²¹ however, in this state of nature anyone is free by force to take one’s property and there is no recourse, other than responding in kind, to this violation.⁷²² Therefore man entered into a society, created government and the state in order to provide protection of property.⁷²³ However, Locke’s Labour theory of property was controversial in his own day⁷²⁴, and indeed, as has been discussed was not a novel argument but one that had been debated during the 15th century.⁷²⁵ Hobbes took a similar view that man created the state, or submitted to a sovereign (i.e. Leviathan) in order to gain security from the eternal state of war that existed prior to the state. In his view there cannot be

⁷¹⁹*Ibid*, 743

⁷²⁰Jean-Jacques Rousseau and Christopher Betts (trs), *Discourse on Political Economy and the Social Contract* (OUP 2008), 4

⁷²¹Locke, *Two Treatises of Government* (n 660), 229

⁷²²*Ibid*, 360-361

⁷²³*Ibid*, 323-325, 348, 360

⁷²⁴Waldron, *The Rule of Law* (n 681), 38-39

⁷²⁵Seipp, ‘The Concept of Property in Early Common Law’ (n 601), 62-64

any property when there is no security and in order to have security one needs a state (sovereign).⁷²⁶

However, it is worth noting that this notion that the state is something ‘endured’ for the sake of security is a modern phenomenon. For Aristotle the state (*polis*) was a natural development of humanity, first came the household, then the village then the city. In his view the state is a natural phenomenon, humanity needs it; humans by nature are political animals and therefore create polities. The purpose of the state is not to defend property but to bring about the enjoyment of a good life, property is necessary for the good life⁷²⁷ and the regulation of property is among the most important considerations for the state because the distribution of property is one of the main sources of conflict, and the state should strive to avoid internal conflict.⁷²⁸ Cicero similarly views the state as a natural phenomenon. States are created not because of weakness (i.e. security *a la* Hobbes, Locke, and Rousseau) but because of an “innate desire on the part of human beings to form communities. For our species is not made up of solitary individuals or lonely wanderers.”⁷²⁹ Cicero similarly views the state as being central to the creation of the good life stating that “the good life is impossible without a good state; and there is no greater blessing than a well-ordered state.”⁷³⁰

Of course, it is worth considering that these views do not match the historical reality. James Scott has examined the development of the earliest states and found the evidence does not stack up with the narrative. As he discusses the rise of agriculture and the subsequent rise of the state is central to our narrative of civilizational progress; the superiority of a sedentary, farming society is generally assumed without much

⁷²⁶Thomas Hobbes, Richard Tuck eds., *Leviathan* (CUP 1996), 88-92, 117-121, 145-154

⁷²⁷Aristotle, Ernest Barker (trs), R.F. Stalley (ed), *Politics* (OUP 2009), 8-14

⁷²⁸*Ibid*, 57-58

⁷²⁹Cicero, Niall Rudd (trs), *The Republic and the Laws* (OUP 1998), 19

⁷³⁰*Ibid*, 83

examination. Yet there is considerable evidence of resistance to settlement. This narrative of progress does not stand up to the archaeological evidence.

Mainstream modern legal scholars view the state as being intertwined with the institution of property. Kevin Gray says that “the state takes on a critical... role in defining the concept of ‘property’”. The state itself becomes a vital factor in the ‘property equation: all ‘property’ has a public law character. Private ‘property’ is never truly private.”⁷³¹ Waldron has said that “there is no getting away from the fact that property rights are entangled in public legislation.”⁷³² Kevin Gray and Susan Francis Gray declare that “property is a socially constructed concept.”⁷³³ Several scholars have argued that property is inherently political although the legal system attempts to neutralise this political aspect by making it ‘objective’ and ‘technical’. However, as property is about the allocation of scarce resources it is inherently political.⁷³⁴

Margaret Davis has said that “private property only exists insofar as it is publicly acknowledged through the institution of law.”⁷³⁵ However, property is both an institution and an idea and one that is different from other rights like freedom of speech as “property involves *allocation*: with regard to property, *the giving to one person necessarily denies or takes from another*” (emphasis in original).⁷³⁶ The protection of rights like freedom of speech are ‘cheap’ to society as protecting one person’s freedom of speech does not take anything away from another person. The protection of property is different, however. “If the enjoyment of a particular good by one person is protected, then the enjoyment of that same good by others is denied. The extension of property

⁷³¹Gray, ‘Property in Thin Air’ (n 36), 304

⁷³²Waldron, *The Rule of Law* (n 681), 34

⁷³³Gray, *Land Law* (n 692), 35

⁷³⁴David Cowan, Lorna Fox O’Mahony and Neil Cobb *Great Debates in Property Law* (Palgrave Macmillan 2012), 4, 21-22

⁷³⁵Davies, *Property* (n 41), 11

⁷³⁶Laura S. Underkuffler-Freund, ‘Property: A Special Right’ (1996) 71 Notre Dame L. Rev. 1033, 1038-1039

protection to one person *necessarily and inevitably* denies the same right to others.”⁷³⁷

Property “is, in its essence, the resolution of *conflicting* claims.”⁷³⁸ Therefore the state takes an active role by denying claims and allocating rights to specific persons. Therefore “the state cannot simply be the ‘watchman’ for this right. It cannot protect without intervening. Property rights are, by nature, *positive* rights, *allocative* rights” (emphasis in original).⁷³⁹ Furthermore, she argues that property rights are social rights

they embody how we, *as a society*, have chosen to reward the claims of some people to finite and critical goods, and to deny the claims to the same goods by others. Try as we might to separate this right from choice, conflict, and vexing social questions, it cannot be done. (emphasis in original).⁷⁴⁰

This means that

Property rights are not, in fact, private interests which the state neutrally abides. Property rights are collective, enforced, even violent decisions about who shall enjoy the privileges and resources of this society. Questions about what kind of society that we are, and the kind of society that we wish to become, must be inherent parts of the interpretation of this right.⁷⁴¹

The point about enforcement is particularly important. Without effective enforcement property rights are ‘worthless’⁷⁴² as will be discussed in more detail below. However, this does mean that, as Macpherson argues, property is an inherently political concept, especially as it requires society to enforce it and it is enforcement that gives it value.⁷⁴³ As Underkuffler says “property laws, of all laws, are the most inextricably intertwined with the use of coercive state power to allocate the resources necessary for human life.”⁷⁴⁴ This is to be expected because as Waldron argues “all law involves something

⁷³⁷*Ibid*, 1038-1039

⁷³⁸*Ibid*, 1042

⁷³⁹*Ibid*, 1042

⁷⁴⁰*Ibid*, 1046

⁷⁴¹*Ibid*, 1046

⁷⁴²Joireman, *Where There is No Government* (n 688), 5, 25, 153

⁷⁴³Macpherson, ‘The Meaning of Property’ (n 388), 3-4

⁷⁴⁴Laura S. Underkuffler, ‘The Politics of Property and Need’ (2010) 20 Cornell J. L. & Pub. Pol’y 363, 376

like state agency, if only because in the end it is the state that is called upon to come to the aid of private litigants in upholding their private law rights.”⁷⁴⁵ He goes on to argue that “law works holistically. And property rights are not defined in isolation from the rest of the law. What my property rights amount to is partly a matter of how things stand in other areas of the law.”⁷⁴⁶ Property rights are “creations of the law, designed to serve social interests.”⁷⁴⁷ However, as Margaret Davis points out, to say that property is a socially constructed or even legally constructed concept or a political institution created by positive law not nature is not to argue that does not exist but that it is a construct, one that exists in a broader social and cultural context.⁷⁴⁸

There is also an economic context, and it is arguable that the value of property rights is really in the economic context which is enabled and facilitated by the legal institution that property has its value. One proponent of this view Yoram Barzel argues that trying to determine the origins of property rights is a futile, pointless exercise. That in effect, property rights have always existed and even if we could identify a pre-property rights era it would not tell us anything of value. Studying the evolution of property rights is a much more useful exercise.⁷⁴⁹

As a rule, in an already functioning society the creation of rights is an ongoing process. Rights are created in the presence of state authority, which has a comparative advantage over private individuals in the use of violence and which tends to discourage its private use. When a state authority is in place, the role of allocation devices other than violence is greatly enhanced.⁷⁵⁰

Barzel argues that “the government, as a rule, participates in defining and in protecting private [property] rights.” Barzel says that “new rights are created in response to new

⁷⁴⁵Waldron, *The Rule of Law* (n 681), 13

⁷⁴⁶*Ibid*, 70

⁷⁴⁷J. Peter Byrne ‘What We Talk About When We Talk About Property Rights – A Response to Carol Rose’s *Property as the Keystone Right?* (1996) 71 *Notre Dame L. Rev.* 1049, 1058

⁷⁴⁸Davies, *Property* (n 41), 17-18

⁷⁴⁹Yoram Barzel, *Economic Analysis of Property Rights* (CUP 1989), 62

⁷⁵⁰*Ibid*, 63

economic forces.”⁷⁵¹ Which leads to the implication that property rights are “largely a matter of economic value rather than of legal definition.”⁷⁵² The economic context of property rights, particularly the value of the institution will be discussed in greater detail below. However, in connection with the role of the state, enforcement is vital, as Joireman argues, without effective enforcement property rights are ‘worthless’⁷⁵³ and this enforcement role makes the state central to the institution.

7.6 Enforcement, the Rule of Law and the Value of Property Rights

As has been mentioned above, and will be explored in greater detail below, effective enforcement is vital to the institution of property. However, Robert Ellickson has demonstrated it is possible to have ‘order without law’; he argued that society does not necessarily need formal rules to exist and that informal rules are capable of providing, and do provide, considerable order and stability, and this can include property rights.⁷⁵⁴ Ellickson examined cattle ranchers in the Western United States and their ‘informal’ processes for managing access to grazing land. The US gold rushes also provide an interesting case study; there was in effect no law in operation in these camps but miners peacefully established system of property rights.⁷⁵⁵ Violence in the gold mining camps was nowhere near as rampant as is assumed “miners avoided the negative-sum game of violence, opting instead for establishing and enforcing property rights.”⁷⁵⁶ Miners would often work out rules and dispute resolution mechanisms themselves, without the need for formal government. Mining camps tended to create rules regarding property rights, particularly with regard to

⁷⁵¹*Ibid*, 65

⁷⁵²*Ibid*, 42

⁷⁵³Joireman, *Where There is No Government* (n 688), 5, 25, 153

⁷⁵⁴Robert C. Ellickson, *Order without Law: How Neighbors Settle Disputes* (Harvard University Press 1991), 1-6

⁷⁵⁵Barzel, *Economic Analysis of Property Rights* (n 749), 62-63

⁷⁵⁶Terry L. Anderson and Peter J. Hill, *The Not So Wild West: Property Rights on the Frontier* (Stanford University Press 2004), 104

claims. Anderson and Hill report that disputes were usually settled peacefully (though how much of a role the ubiquity of firearms played in this is unclear).⁷⁵⁷ As Anderson and Hill argue

Far from being a ‘theater of tragic events – the scene of bloodshed and strife,’ mining camps in California were a crucible for institutional evolution. Miners recognized violence as a negative-sum game and devised efficient methods for defining and enforcing property rights.⁷⁵⁸

However, circumstances matter, while the surface miners in California were able to rely on informal rules and mechanisms, the subsurface miners of Nevada, by contrast, felt the need for more formal, government backed property rights as the value of the claims they were dealing with were higher, as was the demand for capital investment, meaning miners were willing to spend more pursuing disputes.⁷⁵⁹ This is important, while property rights are about managing access to resources, there is also an economic value to them. This economic value relies on formal property rights, and the rule of law. While it is certainly possible to have ‘order without law’ the economic value of property is only really unlocked by law.

Which is drastically evidenced by the disparity between the West and the developing world, especially those states with weak property rights protections and limited rule of law. As Hernando de Soto has argued the lack of secure legal rights to resources deny many in developing countries use of considerable capital that could be put to productive economic use. He argues that the real advantage of the West is the legal infrastructure that allows the transformation of assets into capital via mortgages and other secured loans; this can only be done with secure formal property rights.⁷⁶⁰

⁷⁵⁷*Ibid*, 105-109

⁷⁵⁸*Ibid*, 115

⁷⁵⁹*Ibid*, 115-119

⁷⁶⁰Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (Black Swan 2001), 6-12

“For decades, economists and development specialists have argued that secure property rights are a precondition for vibrant economic growth.”⁷⁶¹ In classical economics, capital is the driving force of the market economy⁷⁶² and therefore, lack of access to capital or an inability to capitalize resources will hamper, if not entirely prevent, economic development. As de Soto argues “what creates capital in the West, in other words, is an implicit process buried in the intricacies of its formal property systems.”⁷⁶³

“Without clear knowledge of who owns what, it is difficult to make use of a resource...” Furthermore, in the absence of a legal framework of property rights individuals can only do business with those they trust, and an important and valuable source of capital is lost.⁷⁶⁴ However, if, for whatever reason, formal property rights are unavailable, people will seek out informal enforcement mechanisms. Although, in absence of formal institutions backed by law, institutions depend on trust and reputation i.e. personal relationships (which necessarily disadvantage outsiders and limit the number of potential business partners.) Anthropologists and economic historians report “a limitation in trade among the kin group or other small community until the presence of rules governing contracts can be enforced more broadly.”⁷⁶⁵ As Joireman argues, in absence of formal property law, private institutional innovation will provide some form of property rights however significant problems with informal systems can exist and it is very difficult, if not impossible to capitalize informal property.⁷⁶⁶ This is important, while there are benefits to an informal system for space resources as it would allow flexibility for a new industry, space resources will require

⁷⁶¹Joireman, *Where There is No Government* (n 688), 8

⁷⁶²de Soto, *The Mystery of Capital* (n 760), 38

⁷⁶³*Ibid*, 44

⁷⁶⁴Joireman, *Where There is No Government* (n 688), 9-10

⁷⁶⁵*Ibid*, 57-59

⁷⁶⁶*Ibid*, 79

significant capital investment which will likely necessitate security that can only really be provided by a formal system.

There is a balance between the cost of defining and enforcing property rights and the value of doing so. Anderson and Hill stipulate that they would only expect people to expend the time and energy defining and enforcing property rights over scarce resources.⁷⁶⁷ Ultimately it is a scale between the value of the resource and the cost of establishing a regime and engaging with the process. “If ownership rights to property are well defined and can be exchanged, the costs of negotiations decline relative to the costs of taking.”⁷⁶⁸ Given the potential value of space resources, and the capital investment that will be required, the balance is likely to be tilted in favour of formal property rights.

One thing is clear, there needs to be an accepted mechanism for conflict and dispute resolution. Violence can be an effective way to resolve property disputes, but it also wastes valuable resources and can sow the seeds for further violence.⁷⁶⁹ However, the ability to use force (or credibility of threat to use force) is important for enforcement.⁷⁷⁰ Enforcement is vital because as Joireman states “property rights that are not enforceable do not exist”⁷⁷¹

However, there is a difference between power and violence. Power can be understood as dominion with violence being a component of power but power can also be a collective thing, bestowed by a group upon a leader or group of leaders.⁷⁷² State

⁷⁶⁷Anderson and Hill, *The Not So Wild West* (n 756), 4

⁷⁶⁸*Ibid*, 59

⁷⁶⁹Joireman, *Where There is No Government* (n 688), 14-18

⁷⁷⁰*Ibid*, 91

⁷⁷¹*Ibid*, 25

⁷⁷²Ganesh Sitaraman, *The Counterinsurgent's Constitution: Law in the Age of Small Wars* (OUP 2013), 163

institutions are important, however “political institutions are powerful only because they have the support of the people.”⁷⁷³ However,

violence, in contrast, is rooted in individual strength, and the use of weapons and other implements simply augments the natural strength of the individual. Violence can garner obedience through fear, but it does not create power. In fact, violence is a substitute for power- it is used *because* the person is powerless, because she has not been empowered by the group.⁷⁷⁴

Clearly, a powerful state adhering to the rule of law is the best method for protecting and enforcing (though not necessarily defining) property rights however, “people want their property rights defended and will seek the means to have them enforced.”⁷⁷⁵

Where the state is weak or absent, people will turn to ‘non-state actors who are specialists in violence’ to protect and enforce their property rights. Private security companies (PSCs) “in the contemporary era provide security for resource extraction conducted by state-owned companies as well as international corporations.” As Joireman says “natural resource extraction is guarded by private security forces in weak states across the globe...”⁷⁷⁶ However, this should be avoided because a reliance on private security, particularly in a ‘frontier’ environment like outer space, can lead to an uncontrollable avalanche of violence. Indeed, the histories of the various European East India Companies should provide ample warning of allowing ‘private enforcement’ in resource rich and distant arenas.

Furthermore, there is a clear incentive to develop an effective regime as “clearly defined and enforced property rights promote economic development and reduce violence.” However, it is important to recognize that “the presence of a state does not mean that it is the most efficient enforcer of property rights, nor does the presence of

⁷⁷³*Ibid*, 163

⁷⁷⁴*Ibid*, 163

⁷⁷⁵Joireman, *Where There is No Government* (n 688), 159

⁷⁷⁶*Ibid*, 103-108

state institutions mean that non-state alternatives will disappear.”⁷⁷⁷ As Elinor Ostrom has argued, there are a range of solutions and which one is the most appropriate will depend on the situation and circumstances.⁷⁷⁸ However, there is no doubt as to the value of the rule of law to economic value of property rights.

The value of the rule of law for commerce has been recognized for centuries. Indeed, Lord Mansfield argued that commerce needs legal certainty. Articulating that “the daily negotiations and property of merchants ought not to depend upon subtleties and niceties; but upon rules, easily learned and easily retained...”⁷⁷⁹ As well as that “in all mercantile transactions the great object should be certainty: and therefore, it is of more consequence that a rule should be certain...”⁷⁸⁰ Furthermore, Adam Smith recognized the value of strong government to economic success stipulating the need for a “well governed society” in *The Wealth of Nations*.⁷⁸¹ Historian Gordon Wood has argued that despite a disposition to avoid ‘government’ early Americans soon learned, and came to recognize, the value of the rule of law to conduct and trade.⁷⁸²

Modern commentators, scholars, lawyers are just as (if not more) adamant as their 18th century counterparts. Lord Bingham has written that “the successful conduct of trade, investment and business generally is promoted by a body of accessible legal rules governing commercial rights and obligations.” He went on to state that “no one would choose to do business, perhaps involving large sums of money in a country where the parties rights and obligations were vague or undecided.”⁷⁸³ For Todd Zywicki the value of the rule of law is that economic activity requires as much stability as possible

⁷⁷⁷*Ibid*, 153

⁷⁷⁸Elinor Ostrom *Governing the Commons: The Evolution of Institutions for Collective Action* (CUP 2015), 14-15

⁷⁷⁹*Hamilton v Mendes* (1761) 2 Burr 1198, 1214

⁷⁸⁰*Vallejo and Another v Wheeler* (1774) 1 Cowp 143, 153

⁷⁸¹Adam Smith, Andrew Skinner (eds), *The Wealth of Nations, Books I-III* (Penguin 1999), 115

⁷⁸²Gordon S. Wood *Empire of Liberty: A History of the Early Republic, 1789-1815* (OUP 2009), 400-432

⁷⁸³Tom Bingham, *The Rule of Law* (Penguin 2011), 38

which the rule of law helps provide.⁷⁸⁴ Jeremy Waldron argues that the rule of law is desirable for business however he questions whether the rule of law protects economic freedom or whether it is a cultural respect from property which promotes the rule of law? Regardless it is clear that legal consistency and predictability is key to the rule of law and something to be valued.⁷⁸⁵ It is clear that that clear, adhered to ‘rules of the game’ ease the path to economic success and “economists have repeatedly found that the better the rule of law, the richer the nation.”⁷⁸⁶ However, the context matters because as Ryan Avent has argued “an appreciation for property rights, for instance, is valueless unless it is held within a community of like-minded people.”⁷⁸⁷ As Sitaraman has said “having a legal system is not enough for the *rule* of law” (emphasis in original).⁷⁸⁸ Sitaraman says that there is a cultural component to the rule of law which is based on social practices or history this view sees the rule of law as inherently political and therefore needs to be “linked to the political values of the particular society.” This is relevant because there needs to be a ‘buy in’ in order for rules to be effective. “Rules are meaningless if they are ignored in practice, they become mere words on parchment, rather than felt obligations that are followed by most of the population most of the time.”⁷⁸⁹ Legal rules without support or legitimacy among the population can only be imposed by coercion and thus undermine the stability of society.⁷⁹⁰ As discussed above, there is a difference between violence and power; power is more effective and less costly.⁷⁹¹

⁷⁸⁴Todd Zywicki, ‘Economic Uncertainty, the Courts, and the Rule of Law’ (2012) 35 Harv. J. L. & Pub Pol’y 195, 197

⁷⁸⁵Waldron, *The Rule of Law* (n 681), 10-15

⁷⁸⁶‘Economics and the rule of law: order in the jungle’ *The Economist* 13 March 2008, 95-97

⁷⁸⁷Ryan Avent, *The Wealth of Humans: Work and its Absence in the Twenty-first Century* (Penguin 2017), 122

⁷⁸⁸Sitaraman, *The Counterinsurgent’s Constitution* (n 772), 185

⁷⁸⁹*Ibid*, 189

⁷⁹⁰*Ibid*, 200

⁷⁹¹*Ibid*, 163

Sitaraman says that it is best to think of the rule of law as being ‘organic’, in that it grows and develops based on the culture and politics of the society in question.⁷⁹² And as Joireman argues law alone is not enough, “without enforcement, property rights are only constructed mythologies.”⁷⁹³ As she says “the fallacy of legalism occurs when we think that just because a state has made a law, that law is enforced.”⁷⁹⁴

This issue can be highlighted by reference to the 19th century North American fur trade which exemplified the difficulty in regulating and controlling an industry that operates far from the ‘effective control’ of government. The US Federal government tried, for various reasons, to impose regulations on interactions with Native Americans (such as restricting the trading of alcohol) in early 19th century, but the regulations were widely ignored by all but the biggest trade companies and were anyway hard to enforce.⁷⁹⁵ Similarly attempts to control the number and type of beaver harvested for conservation purposes were also largely unsuccessful, due largely to the impotence of the government to enforce them.⁷⁹⁶ The Hudson Bay Company, operating in what is today Canada and under licence from the British Government, had a similar experience with their conservation policies which were introduced as early as 1821 with regards to trappers not directly employed by the company (company employees proved easier to control). However, the exception to this was Blackfoot territory which was rich in beaver but the Blackfoot “repulsed any American attempts to trap these furs” choosing to trade with the Hudson Bay Company instead.⁷⁹⁷ The key difference was that the Blackfoot had the ability to ‘enforce’ their regulations, it was not enough for the US

⁷⁹²*Ibid*, 200-201

⁷⁹³Joireman, *Where There is No Government* (n 688), 39

⁷⁹⁴*Ibid*, 163

⁷⁹⁵David J. Wishart, *The Fur Trade of the American West 1807-1840* (University of Nebraska Press 1979), 70-71

⁷⁹⁶Anderson and Hill, *The Not So Wild West* (n 756), 91-93

⁷⁹⁷Wishart, *The Fur Trade of the American West* (n 795), 29-33

Government to produce legislation. The same may prove true with regards to space resources, indeed enforcement issues are already cropping up, such as with the recent unlicensed launch by Swarm.⁷⁹⁸

It is imperative that the state provide effective enforcement measures because “without a state supply of institutions for property rights enforcement, we should expect to see violence...”⁷⁹⁹ The propensity for violence will clearly scale with the value of the resources in question but it is a looming threat. This is particularly concerning for space resources because this will not happen within a state but rather in an area that ‘belongs’ to the international community, therefore no single state can effectively take action, particularly if (or once) there are participants from multiple states engaging in space resource activities.

A free for all for land and resources leads to a Hobbesian dystopia “but if rules can be established to define and enforce property rights and encourage peaceful trade, order can replace fighting and prosperity can replace hardship.”⁸⁰⁰

However, property rights do not always evolve peacefully and the “lesson we should learn from the ‘not so wild, wild West’ is that secure and transferable property rights may not be easy to develop, but they are a necessity for supplanting conflict with cooperation.”⁸⁰¹ Of course, the Outer Space Treaty does stipulate that the “use of outer space... shall be guided by the principle of co-operation”⁸⁰² and so as to promote “international co-operation”⁸⁰³ strengthening and underpinned by the UN Charter call for “international co-operation in solving international problems.”⁸⁰⁴

⁷⁹⁸David Shepardson, ‘FCC Fines Swarm \$900,000 for Unauthorised Satellite Launch’ (*Reuters*, 20 December 2018) <<https://www.reuters.com/article/us-usa-satellite-fine/fcc-fines-swarm-900000-for-unauthorized-satellite-launch-idUSKCN1OJ2WT>> accessed 10 January 2020

⁷⁹⁹Joireman, *Where There is No Government* (n 688), 160

⁸⁰⁰Anderson and Hill, *The Not So Wild West* (n 756), 9

⁸⁰¹*Ibid*, 212

⁸⁰²Outer Space Treaty (n1), Article IX

⁸⁰³*Ibid*, Article III

⁸⁰⁴UN Charter (n 411), Article 1(3)

7.7 Alternatives

So far, the focus has been on ‘mainstream’ approaches to property, however it is worth considering some of the alternative approaches and models. First, this section will look at Proudhon, one of the original ‘critics’ of property. Then Ostrom and her approach to Common Pool Resources, particularly relevant for outer space. Finally, this section will consider concepts of ‘stewardship’. As was argued in the last chapter, the frontier is where new approaches to property are trialled, there is no reason the ‘final frontier’ should be any different.

7.7.1 Proudhon

Pierre-Joseph Proudhon was one of the more virulent critics of property, particularly the notion that property is a natural right. He is most famously remembered (if usually unattributed) for the declaration that property is theft. As is often the case his argument was more nuanced than that and worth exploring. Proudhon contended “that neither occupation nor labour nor law can create property, which is rather an effect without a cause.”⁸⁰⁵ He started his examination with the Roman legal definition of property which is commonly taken as “as the right to use and abuse a thing within the limits of the law.” However, Proudhon rejects the argument that ‘abuse’ in the context means having an absolute domain over things. He also argues that ‘abuse’ does not include a right to senseless and immoral ‘abuse’ saying that “in matters of property, use and abuse are necessarily indistinguishable.”⁸⁰⁶

He also argues that there is a need to make a distinction between property – the right over a thing – and possession which is a fact not a right (the tenant farmer possesses the farm but he does not enjoy the right of property over the farm, that belongs to the

⁸⁰⁵Proudhon *What is Property?* (n 70), 13

⁸⁰⁶*Ibid*, 35

owner). This distinction leads to two types of right, right in a thing (*jus in re*) and right to a thing (*jus ad rem*).⁸⁰⁷ Proudhon rejects the notion that property is a natural right, certainly the notion that it is equal to the other rights like liberty and equality. In particular he argues that if property is a natural right then why is there so much question as to its origin? If it is really a natural right then its origin is God.⁸⁰⁸ “The right of occupation, or of the first occupant is the result of the actual, physical effective possession of a thing. I occupy a piece of land; the presumption is that I am the proprietor until the contrary is proved.”⁸⁰⁹

Proudhon is critical of the notion of property as a natural right, particularly its equation with other natural rights like ‘life and liberty.’ He repeatedly makes the point that if property is vital to the happiness or even the life of man then surely everyone has an equal right to it? And/or that one only really has the right to that which he actually needs to enjoy the other rights? And especially that there is a perversion in the prevention of people from obtaining that which they need to live in the name of the protection of property (he likes to use the analogy of an islander causing shipwreck survivors to drown in the name of preventing their ‘trespassing’ on his property.)⁸¹⁰

Proudhon feels that it is right that there should be a right of property in the product of labour but does not see why that should give rise to a right of property over the land itself.⁸¹¹ Proudhon attacks the labour theory of origin of property rights in land, arguing that it is primarily only brought out after ‘occupation’ has failed as a defence. He also argues that why should the child of a land owner be able to inherit his father’s land if labour is the justification for ownership, after all the child has not laboured for

⁸⁰⁷*Ibid*, 35-37

⁸⁰⁸*Ibid*, 37-43

⁸⁰⁹*Ibid*, 44

⁸¹⁰*Ibid*, 43-56

⁸¹¹*Ibid*, 56-58

the land.⁸¹² Proudhon attacks the labour theory of property acquisition by using the analogy of the fisherman and the hunter, saying that by their labour they only gain property over the resources (i.e. fish and game) that they have ‘extracted’ but their labour does not entitle them to the land the fish and game were on at time of extraction. Proudhon says that this should be no different for the farmer, sure he is entitled to the crops he has grown but this does not give him property over the land they grew on.⁸¹³ Furthermore, Proudhon asks why if the labour theory of property is true does it still not apply? I.e. if I improve my farmland why do I not gain at least a share of it, why does my landlord who has done no labour on it still own it all?⁸¹⁴

For Proudhon the state is vital to property for “agriculture alone was not enough to establish permanent property; what was necessary was positive laws and magistrates to execute them. What was necessary, in a word, was the civil state.”⁸¹⁵ Proudhon argues that property is something created by society, by the state, it is not God given or ‘natural’. This means that property can change, society has that power, because “society reserves the right to set the conditions of property.”⁸¹⁶ Proudhon asks why in an age driven by science and reason where we are ready to change our understanding of the very nature of the universe itself when new discoveries are made do we so resist changes in our political and philosophical thinking.⁸¹⁷

Proudhon argues that public order and public security only require the protection of the rights of the possessor, the institution of property itself is not necessary for that goal.⁸¹⁸ He goes on to argue that land cannot be appropriated, that it is necessary to

⁸¹²*Ibid*, 67-70

⁸¹³*Ibid*, 84-85

⁸¹⁴*Ibid*, 86-88

⁸¹⁵*Ibid*, 60

⁸¹⁶*Ibid*, 59

⁸¹⁷*Ibid*, 75-76

⁸¹⁸*Ibid*, 79

life and therefore should be held in common just like air, water and light, that its comparative scarcity actually makes this more not less important.⁸¹⁹

To sustain life man thus needs continually to appropriate all kinds of things. But these things do not exist in the same proportions. Some, such as the light of the stars, the atmosphere of the earth, and the water contained in the seas and oceans exist in such great quantities that men cannot create any perceptible increase or decrease; and each one can appropriate as much as he needs without detracting from the enjoyment of others or causing them the least harm. Things of this sort are in some way the common property of the human race; the only duty imposed upon each individual in this regard is in no way to interfere with the enjoyment of others.⁸²⁰

For Proudhon property, established by law, is not a psychological fact, a natural, or moral right but an abstraction, a metaphor, a fiction, established without considering “whether it was right or wrong.”⁸²¹ While the institution of property he attacked is certainly well entrenched it has not endured without further criticism or indeed alternative proposals. Some of these, particularly the notion of stewardship, may prove more suitable to the unique circumstances, physical and legal, of the outer space environment, than the traditional, terrestrial notion of property.

7.7.2 Elinor Ostrom: Institutions for Governing the Commons

Ostrom argues that traditionally there are two approaches to trying to prevent ‘tragedy of the commons’ situations, one a recourse to ‘Leviathan’ or a powerful central government exercising regulatory authority; or two, the imposition of a private property system as a substitution for a common property system.⁸²² Ostrom recognized that while policymakers and similar actors often talk about the ‘best’ method this essentially fell into one of these two categories, either the government was the best manager or the market was the best manager. Ostrom argued that

⁸¹⁹*Ibid*, 70-74

⁸²⁰*Ibid*, 72

⁸²¹*Ibid*, 61

⁸²²Ostrom *Governing the Commons* (n 778), 8-13

We need to recognise that the governance systems that *actually have worked in practice* fit the diversity of ecological conditions that exist in a fishery, irrigation system or pasture, as well as the social systems. There is a huge diversity out there, and the range of governance systems that work reflects that diversity. We have found that government, private and community-based mechanisms all work in some settings.⁸²³

Ostrom was part of the rational choice tradition, though she recognized that actors are not purely rational however they are “purposeful actors who respond to incentives. Institutions shape the incentives that people face and affect the likelihood of whether they will coordinate their actions successfully or whether they will engage in negative-sum games.”⁸²⁴ In this context institutional meant both formal institutions such as the legal system and soft institutions such as cultural attitudes. The traditional view regarding common-pool resources has treated them as all suffering from the same weakness for ‘free riding’ and that therefore they require an external body impose a management regime in order to avoid the ‘tragedy of the commons’. Ostrom argued that this is not always the case and that there are times when the resource users themselves are best placed to devise the management regime and that an external body (such as the government) can actually be the worst or at least worse option.⁸²⁵

“The presumption that an external Leviathan is necessary to avoid tragedies of the commons leads to recommendations that central governments control most natural resource systems.”⁸²⁶ Establishment of private property resources in the case of a herd, for example, means that a common area will be equally divided among the herders, however this model usually assumes that the entire area is homogeneous and static

⁸²³Elinor Ostrom ‘The Future of the Commons: Beyond Market Failure and Government Regulation’ in Elinor Ostrom, Christina Chang, Mark Pennington and Vlad Tarko, *The Future of the Commons: Beyond Market Failure and Government Regulation* (The Institute of Economic Affairs 2012), 70

⁸²⁴Mark Pennington, ‘Elinor Ostrom, Common-pool Resources and the Classical Liberal Tradition’ in Elinor Ostrom, Christina Chang, Mark Pennington and Vlad Tarko, *The Future of the Commons: Beyond Market Failure and Government Regulation* (The Institute of Economic Affairs 2012), 22

⁸²⁵*Ibid*, 22-25

⁸²⁶Ostrom *Governing the Commons* (n 778), 9

which is not always the case. The private property model breaks down even more when discussing nonstationary resources such as fish and water, often these rights focus on things like types of equipment, when certain rights holders can and cannot extract resources or limiting them to a particular quantities. “But even when particular rights are unitized, quantified, and salable, the resource *system* is still likely to be owned in common rather than individually.”⁸²⁷

Ostrom argues that there is not a single, simple solution to managing common pool resources. Her focus is on institutions.

Instead of presuming that optimal institutional solutions can be designed easily and imposed at low cost by external authorities, I argue that ‘getting the institutions right’ is a difficult, time-consuming, conflict-invoking process. It is a process that requires reliable information about time and place variables as well as a broad repertoire of culturally acceptable rules.⁸²⁸

Furthermore, Ostrom argues that

Institutions are rarely either private or public – ‘the market’ or ‘the state.’ Many successful CPR institutions are rich mixtures of ‘private-like’ and ‘public-like’ institutions defying classification in a sterile dichotomy. By ‘successful,’ I mean institutions that enable individuals to achieve productive outcomes in situations where temptations to free-ride and shirk are ever present. A comparative market – the epitome of private institutions – is itself a public good. Once a competitive market is provided, individuals can enter and exit freely whether or not they contribute to the cost of providing and maintaining the market. No market can exist for long without underlying public institutions to support it. In field settings, public and private institutions frequently are intermeshed and depend on one another, rather than existing in isolated worlds.⁸²⁹

One alternative model Ostrom presents is where the “herders themselves can make a binding contract to commit themselves to a cooperative strategy that they themselves will work out.”⁸³⁰

⁸²⁷*Ibid*, 12-13

⁸²⁸*Ibid*, 14

⁸²⁹*Ibid*, 14-15

⁸³⁰*Ibid*, 15

The herders negotiate before placing any cattle on the meadow and contracts are only binding if unanimously agreed. This approach does not depend on the accuracy of information supplied by government as the unanimity requirement ensures a balance and all parties agree to have enforced only that which they have agreed. While a civil court could be used to enforce this agreement Ostrom states that in practice a private arbitrator is often used in real life scenarios. A private arbitrator has the additional advantage in that solutions are further negotiated not imposed. Further advantages of this approach include that the parties as users of the commons have detailed and relatively accurate information about the commons. Additionally, “the self-interest of those who negotiated the contract will lead them to monitor each other and to report observed infractions so that the contract is enforced.” However, this model is not perfect, the users of the commons may get their information wrong about the carrying capacity of the commons, the monitoring system may breakdown, the external enforcer may be less effective than desired etc.⁸³¹

Ostrom’s focuses on these ‘common pool resources’ (CPR), as these are the least well served by the traditional private property model. “The term ‘common-pool resource’ refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.” She stipulates that “it is essential to distinguish between the *resource system* and the flow of *resource units* produced by the system, while still recognizing the dependence of the one on the other.” Examples of resource systems are fishing grounds, groundwater basins, grazing lands, and irrigation canals. “Resource units are what individuals appropriate or use from resource systems.” Examples of resource units are fish, water withdrawn from a reservoir, fodder consumed etc. This analysis

⁸³¹*Ibid*, 16-18

works best with renewable resources especially when the rate of withdrawal is less than the rate of replenishment. It is also worth noting that access to a CPR can be limited to one or multiple actors. Ostrom calls the process of withdrawing resource units from a resource system ‘appropriation’ and those who withdraw them ‘appropriators.’ Appropriators use or consume the units, or input them into production processes, or they transfer ownership to others who then use the resource unit.⁸³²

“A resource system can be jointly provided and/or produced by more than one person or firm. The actual process of appropriating resource units from the CPR can be undertaken by multiple appropriators simultaneously or sequentially. The resource units, however, *are not subject to joint use or appropriation.*”⁸³³

Ostrom says that CPRs can seem like public goods in many aspects, particularly the “relatively high costs of physically excluding” access to the resource system however, the ‘subtractability’ of CPRs makes for a key distinction (i.e. if you take a fish out of the pond I cannot use that fish whereas your use of a weather forecast does not prevent me from also using that weather forecast).⁸³⁴ Ostrom argues that

“no appropriation of resource units can occur without a resource system. Without a fair, orderly, and efficient method of allocating resource units, local appropriators have little motivation to contribute to the continued provision of the resource system.”⁸³⁵

Cooperation among appropriators leads to a higher return for all and some sort of regime or system is necessary.

At the most general level, the problem facing CPR appropriators is one of organizing: how to change the situation from one in which appropriators act independently to one in which they adopt coordinated strategies to obtain higher joint benefits or reduce their joint harm. That does not necessarily mean creating an organization. Organizing is a process; an organization is the result of that process. An organization of individuals who constitute an ongoing enterprise is only one form of organization that can result from the process of organizing.⁸³⁶

⁸³²*Ibid*, 30-31

⁸³³*Ibid*, 31

⁸³⁴*Ibid*, 32

⁸³⁵*Ibid*, 33

⁸³⁶*Ibid*, 38-39

Many of the most successful modes of commons management are so called mixed regimes where certain aspects are individually owned but other assets are communally owned and managed. “Such arrangements work particularly well where the scale of the resource or common-pool resource problem makes it too difficult to create purely individual private property rights...”⁸³⁷ Where there are clear boundaries but the population is highly mobile and diverse it is often more effective to create individual private property rights because this minimises the need for agreement between resource users. However, this approach relies on property rights being reasonably well defined and the existence of effective courts and dispute resolution procedures.⁸³⁸

While Ostrom recognises that external, centrally imposed regulation may be the best solution the presumption should be against doing so. There are several reasons for this presumption. First, central authorities often lack specific knowledge of the resources/assets being regulated and the nature/values of the resource users themselves. Second, centrally devised regimes undermine the incentive for resource users to devise a set of rules for themselves. Finally, a bottom-up, ‘trial and error’ approach is more likely to eventually discover the most effective and efficient management solution than a central imposed one. “States can play a useful role if they facilitate development of the dispute resolution procedures and ensure legal recognition for the local property rights structures which are a key ingredient in creating incentives to overcome free-riding.”⁸³⁹

7.7.3 Stewardship

There are proposals for a shift from the existing property paradigm to one which can be subsumed under the general heading of stewardship. There are a few models for

⁸³⁷Pennington, ‘Elinor Ostrom’ (n 824), 30

⁸³⁸*Ibid*, 30-31

⁸³⁹*Ibid*, 31-35

this new type of property management system, but they all recognize that no property exists in isolation. Not only is this because property is a socially constructed institution but because property is about power; it is about power over resources, about the allocation of scarce resources. By its very nature it creates have and have nots. A shift to a stewardship model would recognize the context in which property exists. There is also an environmental element to this as well, and for lack of a better term, a sustainability element. A recognition that resources are not unlimited and therefore their allocation and use does have broader implications. Despite claims about the vastness of space resources this is as true in outer space as it is on Earth.⁸⁴⁰ Therefore these proposals for a new model of property should be considered, particularly as they have the added benefit of being more compatible with the requirements of the Outer Space Treaty and the body of space law than the existing traditional, terrestrial models of property rights.

Martin Adams argues that one of the issues with the existing property paradigm is that it treats nature itself as capital.

While it's appropriate to compensate companies for their efforts when they convert some of nature's gifts into material goods, why should we allow them to profit from the gifts that nature freely provided to all living beings? We mistakenly believe that a free market should allow people and corporations to profit from nature, yet we've failed to consider the immense cost to live that occurs whenever people are allowed to reap what they haven't sown at the expense of others. While the privatization of capital can lead to production efficiencies that benefit the entire market, the same can't be said for the privatization of nature: Whenever the income stream for nature is privatized, human beings take for themselves the gifts that would better be freely shared with everyone.⁸⁴¹

He argues that most of the major religions, and indigenous peoples, treat nature as a gift; there is a right to access, a right to use, but not a right to own. He does not argue

⁸⁴⁰Elvis and Milligan 'How much of the solar system...' (n 107)

⁸⁴¹Martin Adams *Land: A New Paradigm for a Thriving World* (North Atlantic Books 2015), 15-16

that there is no right to make a profit from the use of nature's 'gifts' his argument is that those who do profit from the utilization of these resources need to compensate the community from which they receive the benefits of these resources.⁸⁴² A less extreme version of this argument is played out with the stewardship concept. William N.R. Lucy and Catherine Mitchell argue

that the notion of stewardship retains enough of the features of private property – in particular, it can accommodate a structure of incentives for stewards – such that the tragedy of the commons will be avoided. Furthermore, the notion can be understood to embody a fairly explicit regime of regulating access to resources. A notion such as this – that supposedly avoids the conceptual and normative snags of private property while avoiding those that both strong and weak versions of common property generate – surely deserves further attention.⁸⁴³

While there are biblical origins to the concept of stewardship, at least in the Western tradition, it has been dissociated from its theological basis in recent scholarship and “enlarged to incorporate the notion that man’s responsibility as custodian of the natural environment...” is a duty “...to the wider human community, perhaps including future generations.” They explain that “...stewardship is a relationship between agents in respect of a particular scarce and material resources...” This means that “control over these resources be exercised with due regard to the interests that other persons, apart from the holder or steward, may have in the resource.”⁸⁴⁴

The steward therefore is a duty bearer not a rights holder, however the steward is not without rights.⁸⁴⁵

...stewardship maintains that the holder, or steward, has some control and rights over the resource, but that control must in the main be exercised for the benefit of specific others. Since the steward’s control must *in the main* be exercised in favour of others, it is not the case that

⁸⁴²*Ibid*, 44-53

⁸⁴³William N.R. Lucy and Catherine Mitchell, ‘Replacing Private Property: The Case for Stewardship’ (1996) 55 Cambridge Law Journal 566, 582

⁸⁴⁴*Ibid*, 583-584

⁸⁴⁵*Ibid*, 584

he must be completely selfless, an island of altruism in a sea of self-interest. Event trustees receive some reward for their stewardship.⁸⁴⁶

Stewardship does not necessarily involve scrapping the notion of private property but a duty to recognize the societal interests in the use of a resource could potentially be tacked on to the concept of private property. Stewardship needs to be conceived of as a replacement for private property not an addition to it. While private property has no link with the public interest, stewardship is explicitly linked though of course the question is then about what interests or whose interests etc and how they are applied.⁸⁴⁷ Property management rules could be viewed as a form of stewardship that are already in existence, and the natural environment, which they are intended to protect, is certainly one of the potential interests that stewardship could be used to further. These are environmental rules designed to aid natural conservation efforts. Environmental rules do not have to limit or restrict ownership rights, they can create positive obligations on the manner in which ownership rights are exercised but leave the property owner free to determine how these are implemented, for example allowing a farmer to determine whether to set aside a portion of his land as a nature reserve or to use it all for farming but within normative standards of good agricultural practice. This is not about collective property as the conservation bodies are not given use or access of the resource nor is it common or communal property as the public are not given rights to use or access the land or even consulted in how it is used.⁸⁴⁸

*“Property management rules are a paradigm of a new generation of property rules introduced to further the collective interest in promoting nature conservation. These rules are best located within a resource allocation model of property rights, but understanding their status and function as an allocative rule requires a reappraisal of property rights theory.”*⁸⁴⁹

⁸⁴⁶*Ibid*, 584

⁸⁴⁷*Ibid*, 585-592

⁸⁴⁸Christopher Rodgers ‘Nature’s Place? Property Rights, Property Rules and Environmental Stewardship’ (2009) 68 Cambridge Law Journal 550, 569-572

⁸⁴⁹*Ibid*, 573

Property management rules

“dictate that the state decides not *by whom* a resource such as land is used – but rather *how, when and in what manner* that resource is used. In this sense the property over which the property management rule applies remains ‘private’ property’.”⁸⁵⁰

Property management means that, for example, before a farmer installs a new drainage system he has to consult with the relevant conservation body who will either suggest an alternative approach that is less damaging, prohibit it (uncommon in practice) or offer a management agreement that protects the environmental conservation of the land. “The law has developed entirely new legal mechanisms to apply property management rules and to enforce positive management prescriptions tailored to nature conservation.” Christopher Rodgers argues that “legal scholarship must also recognise the need for an interdisciplinary approach to the study of the interaction of property rights with the natural environment.”⁸⁵¹

Property is about power. Property is about the allocation of finite resources. Property shapes the society that creates it, entrenching or eliminating inequality. Property law is a framework for society and should be attentive to the needs of present and future generations, the natural environment and the non-human world.⁸⁵²

7.8 Conclusion

This chapter examines property as a legal and political concept as well as an idea and institution. Following on from this theoretical discussion of the nature of property is a discussion of the role of the state in relation to property. The chapter finishes with a discussion of some alternative conceptions of property.

⁸⁵⁰*Ibid*, 573

⁸⁵¹*Ibid*, 573-574

⁸⁵²Gregory S. Alexander, Eduardo M. Penalver, Joseph William Singer, Laura S. Underkuffler, A Statement of Progressive Property, (2009) 94 Cornell L. Rev. 743, 743-744

This chapter has three key, essential arguments. It makes the case that property is an evolving, complex concept which has historical and societal context. There is no one definition of ‘property’, it is not a static or fixed concept. Further, property is a product of society and ultimately government, even in a Lockian state. Property is intertwined with the existence and authority of the state, it is a political creation. Finally, property is ultimately about distribution of resources, it is a mechanism for controlling access to, and use of, various resources be it gold, land or deposits of water ice on far flung asteroids.

Property is fairly central to our economic system and even our political life. That said, it is ill defined and understood. The basic underlying issue is whether property is a right or a thing. However, it does not end there, if it is agreed that property is a right, or a ‘bundle of rights’, the debate then shifts on to whether it is a natural right (with reference to John Locke et al) or whether it is a more positivist construction, a ‘right’ endowed, protected and conceived by society and therefore dependent upon it for its existence.

The property as a ‘thing’ idea is the prevalent popular conception of how property work i.e. my car is my property. Most people do not think of the title or the deed to their car or house as being their property.

Modern legal scholarship takes the view that property is about rights between people in relation to ‘things’, and therefore ‘property’ is a grouping or constellation of elements and rights.

Locke argued that the Earth was given to humanity, by God, as a commons. He constructed the labour theory of property, which stipulated that *in the state of nature* one could acquire property over things through labour. Meaning that if you picked apples from a tree you had ownership over those picked apples because of your labour

in harvesting them. However, this only applied *in the state of nature* and only to a quantity of material that one was capable of using. Further, Locke recognized that in the state of nature, in the absence of any government, one was also powerless to protect one's property without the use of vigilance and force, so the property owner would have to be constantly on guard against those who would take their property by force. This is why humans created society or the state. This was a point he made repeatedly throughout his *Second Treatises*, that the key role or end of political or civil society (by which he essentially meant the state) was the protection and regulation of property and he even went so far as to say that without the protection of the state property has little value, "for I have truly no Property in that, which another can by right take from me, when he pleases, against my consent."⁸⁵³

Modern property scholarship however treats property as a positive right and makes use of some variation of the 'bundle of rights' approach which regards 'property' as being comprised of several 'bundles' of rights such as the right to use, the right to exclude, the right to income et al. That the right to exclude is fundamental to the concept of property is a widely held position among scholars of property law. However, modern property theory has eroded, if it ever was the case, the 'absolute nature' of property indeed as Underkuffler writes "property rights, like all individual rights, are rarely absolute in any society."⁸⁵⁴

Use, it is agreed, is also an important, intrinsic right of property. However, this is not an unlimited or unconstrained right. Furthermore, use is not an exclusive right of the owner, nor does use give rise to ownership. A right to use is certainly part of property, though as mentioned not an absolute right, but it also, on its own does not indicate the

⁸⁵³Locke, *Two Treatises of Government* (n 660), 360-361

⁸⁵⁴Laura S. Underkuffler, 'On Property: An Essay' (1990) 100 Yale L.J. 127, 133

existence of property, in this sense the right to exclude is the stronger ‘stick.’ Several scholars argue the case for the ‘right to income’ is an important aspect of the ‘bundle’ and likely to become increasingly so.⁸⁵⁵

A regular argument made throughout this chapter is that property and the state are intertwined in numerous ways. Various theorists have argued that the State exists or came into existence in order to protect property rights. That without this protection property rights do not have much value.

The western conception of property evolved starting in about 12th century England but not really coming into being in the manner which they are thought of today until the 17th century. It is a legal institution, and as such is dependent upon the state and its enforcement mechanisms. Indeed, this is the view of the mainstream of modern legal scholars. Furthermore, even if Locke was right, his claims about the labour theory of acquisition were only valid in the state of nature, and we are no longer in the state of nature, even in outer space.

As mentioned, mainstream modern legal scholars view the state as being intertwined with the institution of property. Kevin Gray says that “the state takes on a critical... role in defining the concept of ‘property’”. The state itself becomes a vital factor in the ‘property equation: all ‘property’ has a public law character. Private ‘property’ is never truly private.”⁸⁵⁶ Waldron has said that “there is no getting away from the fact that property rights are entangled in public legislation.”⁸⁵⁷ A leading textbook on land law in the UK declares that “property is a socially constructed concept.”⁸⁵⁸ Several

⁸⁵⁵Christman, *The Myth of Property* (n 699), 7; Macpherson, ‘The Meaning of Property’ (n 388), 8-9; Barzel, *Economic Analysis of Property Rights* (n 749), 2; Cohen, ‘Property and Sovereignty’ (n 703) 159-161

⁸⁵⁶Gray, ‘Property in Thin Air’ (n 36), 304

⁸⁵⁷Waldron, *The Rule of Law* (n 681), 34

⁸⁵⁸Gray, *Land Law* (n 692), 35

scholars have argued that property is inherently political although the legal system attempts to neutralise this political aspect by making it ‘objective’ and ‘technical’. However, as property is about the allocation of scarce resources it is inherently political.⁸⁵⁹ The state is of vital necessity to property right as without effective enforcement property rights are ‘worthless’.⁸⁶⁰ Only the State can truly offer effective enforcement of property right, particularly in a way that is economically valuable. Force can be used to protect ‘property’ and indeed when the State is weak people are often forced to turn to private or non-governmental sources of protection. However, force in and of itself does not provide the necessary protection, legal legitimacy is necessary as otherwise there is no remedy other than reciprocal violence in the event of a violation or seizure of ones property by a stronger other. As Locke himself argued.⁸⁶¹

Pierre-Joseph Proudhon was one of the more virulent critics of property, particularly the notion that property is a natural right. He is most famously remembered (if usually unattributed) for the declaration that property is theft.⁸⁶² However, his critique was more nuanced than that. He argued that as property is something created by society, by the state, it is not God given or ‘natural’. This means that property can change. That society has that power, because “society reserves the right to set the conditions of property.”⁸⁶³ He also argued that public order and public security only require the protection of the rights of the possessor, the institution of property itself is not necessary for that goal.⁸⁶⁴ He argued that that which is necessary for life, land, air,

⁸⁵⁹Cowan, et al, *Great Debates in Property Law* (n 734), 4, 21-22

⁸⁶⁰Joireman, *Where There is No Government* (n 688), 5, 25, 153

⁸⁶¹Locke, *Two Treatises of Government* (n 660), 360-361

⁸⁶²Proudhon *What is Property?* (n 70), 13

⁸⁶³*Ibid*, 59

⁸⁶⁴*Ibid*, 79

water, light et al, cannot be appropriated and should be held in common, so that all could have what they need.⁸⁶⁵

Ostrom focused on ‘common pool resources’ (which, arguably so did Proudhon, he just did not use that term). Ostrom argued that many of the most successful modes of commons management are so called mixed regimes where certain aspects are individually owned but other assets are communally owned and managed⁸⁶⁶ A key aspect of this approach is to ensure that property rights are reasonably well defined and there are effective courts and dispute resolution procedures.⁸⁶⁷

While Ostrom recognises that external, centrally imposed regulation may be the best solution she argues that there should be a presumption against it. There are several reasons for this presumption. First, central authorities often lack specific knowledge of the resources/assets being regulated and the nature/values of the resource users themselves. Second, centrally devised regimes undermine the incentive for resource users to devise a set of rules for themselves. Finally, a bottom-up, ‘trial and error’ approach is more likely to eventually discover the most effective and efficient management solution than a central imposed one.⁸⁶⁸

Finally, there are proposals for a shift from the existing property paradigm to one which can be subsumed under the general heading of stewardship. There are a few models for this new type of property management system, but they all recognize that no property exists in isolation. Not only is this because property is a socially constructed institution but because property is about power, it is about power over resources, about the allocation of scarce resources. By its very nature it creates have and have nots. A shift to a stewardship model would recognize the context in which

⁸⁶⁵*Ibid*, 70-74

⁸⁶⁶Pennington, ‘Elinor Ostrom’ (n 824), 30

⁸⁶⁷*Ibid*, 30-31

⁸⁶⁸*Ibid*, 31-35

property exists. There is also an environmental element to this as well, and for lack of a better term, a sustainability element. A recognition that resources are not unlimited and therefore their allocation and use does have broader implications. Despite claims about the vastness of space resources this is as true in outer space as it is on Earth.⁸⁶⁹ Therefore these proposals for a new model of property should be considered, particularly as they have the added benefit of being more compatible with the requirements of the Outer Space Treaty and the body of space law than the existing traditional, terrestrial models of property rights.

This chapter has three key, essential arguments. It makes the case that property is an evolving, complex concept which has historical and societal context. There is no one definition of ‘property’, it is not a static or fixed concept. Further, property is a product of society and ultimately government, even in a Lockean state. Property is intertwined with the existence and authority of the state, it is a political creation. It relies on the state for enforcement, and it is enforcement which gives property meaning, economic value. Finally, property is ultimately about distribution of resources, it is a mechanism for controlling access to, and use of, various resources be it gold, land or deposits of water ice on far flung asteroids. When contemplating property in outer space it is worth considering that it will need to adapt to this new environment just as it has been adapted to other environments and circumstances. As Proudhon asked why in an age driven by science and reason where we are ready to change our understanding of the very nature of the universe itself when new discoveries are made do we so resist changes in our political and philosophical thinking?⁸⁷⁰

⁸⁶⁹Elvis and Milligan ‘How much of the solar system...’ (n 107)

⁸⁷⁰Proudhon *What is Property?* (n 70), 75-76

The next chapter examines sovereignty and jurisdiction, which are of vital importance to this discussion as it determines how and where States can exercise their power. This impacts how property rights regimes can be created. The limitations on the exercise of sovereignty in Article II of the Outer Space Treaty curb the ability of the State to create property rights, but not to exercise jurisdiction over their nationals or their activities, as will be discussed in the next chapter.

Chapter Eight: Sovereignty and Jurisdiction

8.1 Introduction

The preceding chapter provided a comprehensive overview of property it made three core arguments. Property is an evolving, complex concept which has historical and societal context. There is no one definition of ‘property’, it is not a static or fixed concept. Further, property is a product of society and ultimately government. Property is intertwined with the existence and authority of the state, it is a political creation. It relies on the state for enforcement, and it is enforcement which gives property meaning, economic value. Finally, property is ultimately about distribution of resources, it is a mechanism for controlling access to, and use of, various resources be it gold, land or deposits of water ice on far flung asteroids. When contemplating property in outer space it is worth considering that it will need to adapt to this new environment just as it has been adapted to other environments and circumstances.

This chapter will examine the concepts of sovereignty and jurisdiction and how they apply to outer space. Sovereignty underpins the international order and jurisdiction is how States exercise their power and determines over whom they can do so. Therefore, it is imperative than an examination of the concepts be undertaken.

The first section of this chapter examines sovereignty in its modern form. It recognizes that at its core sovereignty is about the exercise of power. Furthermore, sovereignty is inherently territorial in nature, at least in the ‘post-Westphalian’ conception, which is why it is generally presumed to be banned from ‘outer space.’ The following section examines the nature of territory, which is the basis for territorial sovereignty, however it highlights that there are alternative variants of the exercise of sovereignty which are discussed in later sections of the chapter. Th next section discusses how sovereignty

continues to evolve, particularly beyond the ‘Westphalian’ ‘territorial’ model. This has relevance because future developments may prove more amiable to the intentions of the Outer Space Treaty. The following section takes a step back and looks at the origins of sovereignty, highlighting that it is not a monolithic or static concept. As well as conceptions of sovereignty as being about rule over people rather than territory as was generally the case in the middle ages. A conception which would not conflict with Article II OST and indeed survives as one of the forms of ‘extraterritorial jurisdiction’ in modern international law. The next section builds on the ‘origins of sovereignty section’ and examines developments primarily in the 17th century as European states began to extend their power beyond their European territorial domains. It focuses in particular of exercise of authority at sea which has direct analogy to outer space. The final section discusses jurisdiction itself with a specific focus on extraterritorial jurisdiction as this is the version that can be exercised by states in outer space. However, it underlines that the key to jurisdiction beyond having the right to exercise authority is having the power to do so.

8.2 Modern Sovereignty

Article II of the Outer Space Treaty prevents the exercise of sovereignty from being a basis for national appropriation of outer space, including the moon or other celestial bodies. However, States are not prohibited from exercising sovereignty in outer space. This is vital for an international regime to govern activities of non-state actors in outer space because sovereignty is the basis upon which States exercise legitimate authority. Sovereignty is about the right to ‘rule’.⁸⁷¹ It is important to understand the nature and

⁸⁷¹Dieter Grimm and Belinda Cooper (trs), *Sovereignty: The Origin and Future of a Political and Legal Concept* (Columbia University Press 2015), 104

bounds of sovereignty in order to understand how to exercise sovereignty in outer space within the boundaries set by Articles I and II of the Outer Space Treaty.

The modern concept of sovereignty, often called the Westphalian Model, after the system that was established in Europe after the Treaty of Westphalia of 1648 which ended the Thirty Years War, is fundamentally tied to a territorial notion of statehood. It presumes that a state has supreme authority over its territory. Sovereignty and territory are intrinsically intertwined in international law. As one scholar has written in a leading textbook on international law:

International law is based on the concept of the state. The state in its turn lies upon the foundation of sovereignty, which expresses internally the supremacy of the governmental institutions and externally the supremacy of the state as a legal person. But sovereignty itself... is founded upon the fact of territory. Without territory, a legal person cannot become a state. It is undoubtedly the basic characteristic of a state and the one most widely accepted and understood.⁸⁷²

Sovereignty has two dimensions to it. There is internal and external sovereignty. Internal sovereignty about where authority resides within a state whereas external sovereignty is about the independence of the state, there being no higher authority that the state answers to. “Sovereignty in its legal usage has a connection to rule, in the sense that it involves the *right* to rule...”⁸⁷³ Or put another way “sovereignty is about the right, and not the ability, to be sovereign.”⁸⁷⁴ Although, the ability to govern is important, demonstrating intention to act as a sovereign is a key aspect of the question of title over territory.⁸⁷⁵ As was discussed in the *Eastern Greenland* case “legislation is one of the most obvious forms of the exercise of sovereign power.”⁸⁷⁶

⁸⁷²Malcolm N. Shaw *International Law* (7th edn. CUP 2014), 352

⁸⁷³Grimm, *Sovereignty* (n 871), 104

⁸⁷⁴Jo Eric Khushf Murkens *From Empire to Union: Conceptions of German Constitutional Law Since 1871* (OUP 2013), 144

⁸⁷⁵Crawford, *Brownlie's Principles* (n 159), 226

⁸⁷⁶*Eastern Greenland* (n 382), 48

Sovereignty is about power; it is a way of describing the existence of political power. A way of explaining where legitimate authority within a state resides. As F.H. Hinsley wrote “men do not wield or submit to sovereignty. They wield or submit to authority or power.”⁸⁷⁷ Primary aspect of the modern understanding of the concept of sovereignty is the territorialisation of political power. “State rule is territorially limited rule.”⁸⁷⁸ The concept of sovereignty essentially means the legal competence which a state enjoys in respect of its territory. “This competence is a consequence of title.” Materials of international law use the term sovereignty to describe both title and the legal competence that comes from it. However sovereign rights are different from the concept of territorial sovereignty.⁸⁷⁹ This is important, particularly within the context of Article II of the Outer Space Treaty, which bars sovereignty serving as a basis for national appropriation, as a way of acquiring territory in outer space but not the exercise of sovereignty. Therefore, it is important to examine the concept of ‘territory.’

8.3 Territory

As discussed, territorial sovereignty is central to the modern concept of sovereignty. The State which is the central element of the international order is conceived of as a territorial unit. Article II of the Outer Space Treaty prohibits the acquisition of territory in outer space. States are keen to emphasise that they are exercising sovereign authority over activities not the resources themselves when they are legislating for space resource activities. Therefore, it is necessary to consider what is territory. This section examines the concept of territory in international law and how it relates to the exercise of state authority.

⁸⁷⁷F.H. Hinsley, *Sovereignty* (2nd edn. CUP 1986), 1

⁸⁷⁸Grimm, *Sovereignty* (n 871), 77

⁸⁷⁹Crawford, *Brownlie's Principles* (n 159), 205-212

States require territory, although the exact boundaries and nature of that territory can be flexible. There is also no minimum size required for a state.⁸⁸⁰ Territory is central, fundamental even, to the Westphalian system of international law, which is based upon the sovereign, territorial state.⁸⁸¹ The concept of sovereignty essentially means the legal competence which a state enjoys in respect of its territory. “This competence is a consequence of title.” Materials of international law use the term sovereignty to describe both title and the legal competence that comes from it.⁸⁸²

Shaw argues that there is often confusion between jurisdiction and territory, exercise of jurisdiction is not necessarily territorial. However, the concepts are linked and inherent in the concept of territorial sovereignty is a right to exclusivity of jurisdiction or authority on the part of the state over its territory. Therefore, it is potentially useful to distinguish between *imperium* and *dominium* – nations both own their territory and have a right to regulate and control whatever happens on that territory.⁸⁸³ Although as Crawford argues,

international law defines ‘territory’ not by adopting private law analogies of real property but by reference to the extent of governmental power exercised, or capable of being exercised, with respect to some territory and population. Territorial sovereignty is not ownership of but governing power with respect to territory. There is thus a good case for regarding government as the most important single criterion of statehood, since all the others depend upon it.⁸⁸⁴

Once again, power and authority show to be the key. Further, international law is shifting away from the traditional state centric, territorial model⁸⁸⁵ though this is part of a slower overarching evolution of the international system.

⁸⁸⁰M.N Shaw, ‘Territory in International Law’ (1982) 13 Netherlands Yearbook of International Law 61, 61

⁸⁸¹*Ibid*, 62

⁸⁸²Crawford, *Brownlie’s Principles* (n 159), 211-212

⁸⁸³Shaw, ‘Territory in International Law’ (n 880), 67-74

⁸⁸⁴James Crawford *The Creation of States in International Law* (2nd edn, OUP 2006), 56

⁸⁸⁵Shaw, ‘Territory in International Law’ (n 880), 64-65

However, territory remains an important part of the international order, but it cannot be the basis for State authority in outer space. Outer space needs a different, non-territorial model in order to remain within the framework of the Outer Space Treaty. The next section will discuss developments of ‘post-modern’ sovereignty, particularly in the post-cold war era and the development of a more globalised world. In this approach there is perhaps a model for an international legal regime for the governance of space resource activities within the framework established by Article II of the Outer Space Treaty.

8.4 Post-Modern Sovereignty?

Sovereignty, and indeed the state is an evolving concept. The territorial state remains the central building block of the United Nations and the international order⁸⁸⁶ but it is being redefined “not least by the forces of globalisation and international co-operation. States are now widely understood to be instruments at the service of their peoples, and not vice versa.”⁸⁸⁷ This section will discuss the ongoing paradigm shift in the operation of sovereignty and the state in the international system. With organizations like the United Nations and NATO ‘shared’ sovereignty, which was once unthinkable, has become the norm even if within limited constraints. This section will emphasise the necessity of thinking of sovereignty not as a monolithic or unchanging concept but an evolving one. As humanity spreads into outer space it will undoubtedly evolve; if it wishes to continue to operate within the framework of the Outer Space Treaty the territorial component will need to be shed almost entirely. That does not necessarily mean an end to the state, however.

⁸⁸⁶Weiss, et al *The United Nations and Changing World Politics* (n 209), 163

⁸⁸⁷Kofi Annan, ‘Two Concepts of Sovereignty’ (The Economist, 16 September 1999) <<http://www.economist.com/node/324795>> accessed 10 January 2020

It is clear that absolute and exclusive sovereignty no longer exists, if indeed it ever existed, and as former UN Secretary General Boutros Boutros-Ghali wrote “a major intellectual requirement of our time is to rethink the question of sovereignty – not to weaken its essence, which is crucial to international security and cooperation, but to recognize that it may take more than one form and perform more than one function.”⁸⁸⁸ Indeed, the evolution of sovereignty to a paradigm more suited to the modern international order has been developing for some time. As Weiss, Forsythe, Coate and Pease argue

The process by which a territorial state’s assumed sovereignty has given way to shared authority and power between the state and international organizations is not a recent phenomenon. These changes accelerated with the start of the United Nations in 1945, became remarkable from about 1970, and became spasmodically dramatic from about 1991.⁸⁸⁹

This however has not resulted in an abandonment of the principles of state sovereignty,⁸⁹⁰ nor the Westphalian or ‘Liberal’ international order.⁸⁹¹ Further, while there are those who have argued that the Westphalian system is unsuitable to domains such as outer space,⁸⁹² there are also those who argue that “Westphalian approaches have also thrived when it comes to governing the commons, such as the ocean, the atmosphere, outer space and Antarctica.” Adding that “such agreements are not challenges to the sovereignty of the states that create them but collective measures to solve problems they cannot address on their own.” Furthermore, Deudney and Ikenberry argue that agreements such as the Outer Space Treaty “do not challenge the Westphalian system; they codify it. The UN, for example, enshrines the principle of

⁸⁸⁸Boutros Boutros-Ghali (1992/1993) ‘Empowering the United Nations’ 72 *Foreign Affairs* 98 <<https://www.foreignaffairs.com/articles/1992-12-01/empowering-united-nations>>

⁸⁸⁹Weiss, et al *The United Nations and Changing World Politics* (n 209), 163

⁸⁹⁰*Ibid*, 240

⁸⁹¹Daniel Deudney and G. John Ikenberry, ‘Liberal World: The Resilient Order’ (2018) 97 *Foreign Affairs* 16, 21

⁸⁹²Shaw, ‘Territory in International Law’ (n 880), 66

state sovereignty and, through the permanent members of the Security Council, the notion of great-power decision-making. All of this makes the order more durable.”⁸⁹³

Finally, as Shaw has said, there is acceptance of the idea that

the Westphalian state concept of international relations is inadequate for the exploration and exploitation of areas of relative inaccessibility requiring highly advanced technology, the two examples being outer space and the sea-bed and ocean floor of the high seas. In both cases, the international community has declared that the territorial concept is invalid.⁸⁹⁴

As discussed above, that does not necessarily mean an overthrow of the system as there are models, such as the ‘nationality principle’ which enable the operation of the sovereign State outside of the territorial paradigm. The next sections will discuss the history and origin of the concept of sovereignty and, in part, demonstrate how it has not always been wed to ‘territory.’ This will illuminate the ways in which States can exercise their sovereignty in outer space without violating Article II of the Outer Space Treaty.

8.5 Origins of Sovereignty

This section will examine the origins of the concept of sovereignty and its fluctuating relationship with territory. This section will demonstrate that the concept of sovereignty is a complex, layered concept which has evolved over centuries of European political thought. Some ‘relics’ or ‘ghosts’ of these earlier conceptions remain in the modern conception, such as the ‘nationality principle’, which survives into the space age in both Articles VI and VIII of the Outer Space Treaty and is a holdover from the feudal conception of sovereignty as a personal rather than territorial relationship between ruler and ruled. This section will also show that the development of the modern conception of sovereignty is intimately linked with the development of

⁸⁹³Deudney and Ikenberry, ‘Liberal World’ (n 891), 21

⁸⁹⁴Shaw, ‘Territory in International Law’ (n 880), 66

European empires and the extension of ‘power’ and ‘jurisdiction’ to the new lands. While the space law community does not face issues of how to deal with ‘indigenous title’ there is nevertheless considerable similarity with the questions facing the likes of Vitoria, Grotius, Hobbes, and others. Indeed, whether directly or indirectly their influence is felt in space law, not least in the ‘freedom of exploration and use’ principle expressed in Article I of the Outer Space Treaty.

As a political concept sovereignty has been around at least since the time of Aristotle. For Aristotle, the civic body was sovereign and thus where sovereignty lay depended upon the type of constitution; in a democracy for example the people are sovereign, in a monarchy it resides in the crown.⁸⁹⁵ Cicero’s focus was fixed on the Roman constitution but his understanding of the mechanism of sovereignty was similar. For Cicero “a republic is the property of the public. But a public is not every kind of human gathering, congregating in any manner, but a numerous gathering brought together by legal consent and community of interest.”⁸⁹⁶ However, the ‘classical’ and ‘medieval’ state was radically different from the modern state. For one jurisdiction was generally defined as being between a ruler and his subject rather than territorially defined.⁸⁹⁷

The development of the modern sovereign state was a lengthy process, stretching from the 12th to 19th centuries.⁸⁹⁸ The notion that territoriality was not merely a component of sovereignty but its defining, central feature is a product of the 19th century. Early Modern understandings of what constituted sovereignty were more flexible. This was partially because the application of government control was not uniform, it is better to think of zones, corridors, and enclaves of sovereignty rather than the uniformity

⁸⁹⁵Aristotle, *Politics* (n 727), 97-101

⁸⁹⁶Cicero, *The Republic* (n 729), 19

⁸⁹⁷Kal Raustiala *Does the Constitution Follow the Flag? The Evolution of Territoriality in American Law* (OUP 2009), 9-18

⁸⁹⁸Randall Lesaffer, Jan Arriens trans., *European Legal History: A Cultural and Political Perspective* (CUP 2009), 309

displayed in maps. It is also important to remember that there was a significant personal, portable dimension to subjecthood.⁸⁹⁹ However, it is also worth noting that the concept of *respublica christiana* undermined the concept of external sovereignty, until the Reformation, all Western Christian rulers, at least theoretically and formally, recognized the Pope as a higher authority.⁹⁰⁰

Questions regarding the nature of the state began to emerge during the Renaissance. Political society was becoming associated with the territorial community by 15th century and need for government had gained acceptance.⁹⁰¹ For Grotius, the state was a given, it was an association of free ‘men’ created for the protection of their rights and interests, “his definition was philosophical rather than legal: the existences of States was taken for granted; the States, like the men who compose it, was automatically bound by the law of nations which was practically identical with the law of nature...”⁹⁰² Vitoria’s definition, which was more legal in nature, and involved the concepts of effective governance and independences, however Vitoria’s definition was mainly concerned with who had the right to declare war.⁹⁰³

Bodin was the first to combine absolute rulership with social contract, forming the modern notion of sovereignty.⁹⁰⁴ For Bodin, “sovereignty is the absolute and perpetual power of a commonwealth.”⁹⁰⁵ Sovereign power “is perpetual” and unlimited in power or duration.⁹⁰⁶ Bodin wrote that

“no matter how much power they have, if they are bound to the laws, jurisdiction, and command of someone else, they are not sovereign. For the prerogatives of sovereignty have to be of such a sort that they apply

⁸⁹⁹Lauren Benton, *A Search for Sovereignty: Law and Geography in European Empires, 1400-1900* (CUP 2010), 2-4

⁹⁰⁰Lesaffer, *European Legal History*: (n 898), 309

⁹⁰¹Hinsley, *Sovereignty* (n 877), 130-131

⁹⁰²Crawford *The Creation of States in International Law* (n 884), 6

⁹⁰³*Ibid*, 7

⁹⁰⁴Larry May, *Limiting Leviathan: Hobbes on Law and International Affairs* (OUP 2013), 21-22

⁹⁰⁵Jean Bodin, Julian H. Franklin eds, *On Sovereignty: Four Chapters from the Six Books of the Commonwealth* (CUP 1992), 1

⁹⁰⁶*Ibid*, 1-3

only to a sovereign prince. If, on the contrary, they can be shared with subjects, one cannot say that they are marks of sovereignty.”⁹⁰⁷

However, Benton notes that “Bodin’s sixteenth-century tract of sovereignty is notable for its utter lack of attention, and even mention, of territory. Bodin’s definition of sovereignty was fundamentally juridical.”⁹⁰⁸

Hobbes borrowed from Bodin’s conception of sovereignty, although Bodin’s understanding was more rooted in natural law than Hobbes. Further, Bodin viewed the ‘people’ as a collective entity, not a grouping of individuals.⁹⁰⁹ For Hobbes, the ‘sovereign’ was the person or institution that provides peace and security, his ‘leviathan’.⁹¹⁰ Hobbes also borrowed from Richard Hooker’s notions of covenant-based rulership.

For Hooker, moral obligation is created by the explicit or implicit consent of individuals. Unless the individual person, not merely that person’s group, consents to the law-maker, the individual is not properly obligated. On this point, Hobbes and Hooker were in complete agreement.⁹¹¹

May argues “that Hobbes clearly disfavored divided sovereignty (at least in *Leviathan*), but... Hobbes did agree that sovereignty could and should be limited.”⁹¹²

Although May further argues that Hobbes could accept the current international ‘civil society’ as states stepping out of the international ‘state of nature’, that associations between states are possible and within the prevue of the sovereign to do whatever is necessary to protect his people. After all we do not have a world sovereign, the UN and the ICJ are voluntary associations of sovereign powers.⁹¹³

Hobbes is not a realist who advocates an amoral or immoral international policy. He opens the door for the kind of limited social

⁹⁰⁷*Ibid*, 49

⁹⁰⁸Benton, *A Search for Sovereignty* (n 899), 287

⁹⁰⁹May, *Limiting Leviathan* (n 904), 22

⁹¹⁰Hobbes, *Leviathan* (n 726), 86-92, 117-121, 145-154

⁹¹¹May, *Limiting Leviathan* (n 904), 22-23

⁹¹²*Ibid*, 23

⁹¹³*Ibid*, 180-183

contract of States or of sovereigns that is quite a bit like what we find today. The best way to see this is to use the analogy between States and individual persons who find their way out of the state of nature by forming a commonwealth. Individual States could do the same, especially since Hobbes says that the risks of cooperation in forming a society among States at the international level are not as great as at the level of forming a society among individual persons⁹¹⁴

Writers like Grotius, Hobbes and Vitoria were trying to come to terms with the emergence of the modern state in the early modern period, effectively codified by the Treaty of Westphalia of 1648, which promoted and entrenched the principle of territorial jurisdiction in Europe.⁹¹⁵ Pre-modern polities were not as territorially defined, jurisdiction was generally defined as being between a ruler and his subject. “Law was primarily tied to persons, not places.”⁹¹⁶ This principle survives in modern international law as the ‘nationality principle’ which, as mentioned, is expressed in Articles VI and VIII of the Outer Space Treaty and provides a basis for states to exercise jurisdiction over space resource *activities* if not over the resources themselves.

Additionally, early modern political theorists were trying to deal with the emergence of European empires in the far-flung corners of the world. This required a consideration of how ‘original’ title could be formed and a justification for seizing territory from non-European inhabitants, as well as the basis for jurisdiction over those areas beyond their traditional realms. Much of Vitoria’s work, for example, focuses on the legal (and moral) basis for Spain’s American empire.⁹¹⁷ While space lawyers will not have to deal with existing inhabitants, there are similar questions facing the discipline regarding how exactly to exercise jurisdiction, particularly over ‘resources’

⁹¹⁴*Ibid*, 244-245

⁹¹⁵Raustiala *Does the Constitution Follow the Flag* (n 897), 10-11

⁹¹⁶*Ibid*, 9-10

⁹¹⁷See generally, Francisco de Vitoria, Anthony Pagden (eds) Jeremy Lawrance (trans) *Vitoria: Political Writings* (CUP 1991)

as faced their early modern counterparts. Furthermore, it is important recognize the imperial nature of much of this aspect of international law, particularly given the ‘anti-colonial’ nature of the non-appropriation principle expressed in Article II of the Outer Space Treaty.

Later writers such as Rousseau regarded ‘sovereignty’ as “the supreme authority” and distinguished it from ‘government’; the sovereign has “the right to legislate, and in certain cases impose obligations on the nation or the body” whereas government “has the power only to execute, and can impose obligations solely on private individuals.”⁹¹⁸ The French and American revolutions further helped shift conception of sovereignty away from that of *a* ruler, i.e. the King, to a more popular or national basis i.e. the people. Paine wrote that “for as in absolute governments the King is law, so in free countries the law *ought* to be King; and there ought to be no other” (emphasis in original.)⁹¹⁹

The modern concept of sovereignty is bound together with European imperialism and territory; ‘territorial sovereignty’ is the central focus of the modern concept.⁹²⁰ As Robert Jackson has written “sovereignty is a territorial definition of political authority. Territoriality became the foundation principle of sovereign statehood in the early-modern period, and it has remained so ever since.”⁹²¹ However, as will be examined in the next section, while territory is the foundational principle of sovereign statehood it is not the only aspect. Jurisdiction over activities on the ocean demonstrates that clearly, at the same moment as European states were territorialising their sovereignty, they were also expanding it to control activities on the ocean, where, while not with

⁹¹⁸Rousseau *Discourse on Political Economy* (n 720), 6

⁹¹⁹Thomas Paine, Mark Phillip (eds), *Rights of Man, Common Sense and Other Political Writings* (OUP 1998), 34

⁹²⁰Robert Jackson, *Sovereignty* (Polity 2007), 82

⁹²¹*Ibid*, 104

the absolute nature expressed in Article II of the Outer Space Treaty, territorial ownership was effectively prohibited.

8.6 The Ocean

The ocean is often used as an analogy for outer space. The ocean, like outer space, is part of the global commons and is free for use by all states while not being subject, beyond the territorial seas and EEZs, to ‘territorial’ sovereignty. The section below will look at the development of the understanding of sovereignty and jurisdiction in relation to the ocean particularly during the 17th century. Many of the arguments Grotius and others made about the nature of state authority at sea translate almost directly to outer space, even the notion of ‘control’, which while generally an anathema in the context of Article II of the Outer Space Treaty is rearing its ugly head again with the rise of the ‘space forces’.

Benton demonstrates the role that the ocean played in the development of the conception of the modern concept of sovereignty, particularly its relationship with territory. Even while the ocean was understood as a commons it was understood that ships were ‘sovereign territory’ and even routes on the sea could be seen as a kind of territory, viewed as roads, hence the term ‘sea lane’; ships made efforts to avoid crossing the sea lanes of other powers. Lauren Benton says that “...Europeans imagined law as travelling with them along sea routes... Individuals – including seemingly legally marginalized rouges and pirates – did not imagine themselves as cut off from legal authority even when very far from home and on the open seas.”⁹²²

Ship captains had delegated legal authority and “ships played a dual role as sources of order in the oceans: they were islands of law with their own regulations and judicial personal, and they were representatives of municipal legal authorities – vectors of law

⁹²²Benton, *A Search for Sovereignty* (n 899), 105-110

thrust into ocean space.”⁹²³ 17th century theorists recognized that in order for an international law of the sea to work, the interstate order needed to be strong enough to restrain and control non-state actors.⁹²⁴ This is directly analogous to outer space. Article VIII of the Outer Space Treaty makes space objects quasi-sovereign territory, ‘vectors of law’ thrust into outer space. Article VIII and the ‘jurisdiction and control’ exercised over space objects and “any personnel thereof” is the foundation for the legal regime for governance of activities in outer space and will have to be the foundation for any legal regime governing space resource activities. Further, just as with the international law of the sea, the interstate order in outer space will need to be strong enough to restrain and control non-state actors. In outer space, this rests on Article VI of the Outer Space Treaty which makes States responsible for their national’s (nationality principle once again) activities in outer space and requires States to authorise and continually supervise these activities.

17th century theorists like Grotius separated ideas of ownership and jurisdiction. So the ocean was a privileged space owned by no one but subject to competing sovereign jurisdictions.⁹²⁵ “*Dominium*, most commonly thought of as the right to possess territory, and *imperium*, associated with sovereign jurisdiction, remained imprecisely defined, especially in relation to one another, for a long time”⁹²⁶ This was building on earlier thought. Medieval legal scholars followed Roman law and regarded the ocean as *res communis* which therefore could not be owned but also recognized that sovereign jurisdiction could be exercised over the sea, so taxes, for example could be levied. And others could even be excluded (Benton points out that the Venetians did not claim a right of navigation, they claimed a right to prevent others from navigating

⁹²³*Ibid*, 112

⁹²⁴*Ibid*, 120-121

⁹²⁵*Ibid*, 121

⁹²⁶*Ibid*, 4-5

seas they controlled.)⁹²⁷ “As common property, the sea could not be owned, but it could be controlled... This amounted to a kind of property right that was nominally different from dominion.”⁹²⁸

This recognition of jurisdiction over acts at sea may seem to contradict the argument in *Mare liberum* that the sea cannot be possessed by any power. But Grotius was also careful to note the difference between the right of ownership over the sea, which no country could claim because it was impossible to complete title through occupation, and the ‘right over the sea to functions of protection and jurisdiction.’ Full sovereignty would imply both jurisdiction and ownership, and would be impossible...⁹²⁹

Grotius argued that jurisdiction travelled with ships but had no lasting effect on the sea they travelled over. Grotius argued that it was possible to take jurisdiction and control over parts of the sea without taking ownership.⁹³⁰ While jurisdiction over activities in outer space is clearly possible, even required, ‘control’ over outer space or a celestial body would be hard to square with the Outer Space Treaty, particularly Articles I and II. This marks a clear difference with the oceans, however given the impact of the work of the likes of Grotius this may not matter as great power competition expands into outer space; especially if strategic resources (and water is the ultimate strategic resource in space) are up for competition.

This section has looked at the process of extending sovereignty and jurisdiction over the oceans primarily in relation to the thinking promulgated in the 17th century. It demonstrated a clear link between exercise of sovereignty and jurisdiction over activities at sea with the exercise of jurisdiction in outer space. Once again showing that the territorial ‘absolute’ approach to sovereignty, while the predominant aspect to the prevailing paradigm is not the exclusive one. Further, it discussed the issue of

⁹²⁷*Ibid*, 122-123

⁹²⁸*Ibid*, 123

⁹²⁹*Ibid*, 135

⁹³⁰*Ibid*, 135

‘control.’ The next section will discuss jurisdiction in international law which is crucial for the establishment of a legal order governing space resources. It will discuss the relationship between jurisdiction and territory as well as examining the ways that jurisdiction can be exercised outside of a State’s territory.

8.7 Jurisdiction in International Law

Jurisdiction is essential to the functioning of a legal regime. This section discusses the nature of jurisdiction, which while rooted in a territorial basis is not exclusively territorial. It examines how States exercise their jurisdiction beyond or outside of a territorial basis which is vital to the establishment of legal regime governing space resource activities in outer space. It will make the case that States are able to exercise jurisdiction over persons (legal or natural) without making an appropriative claim which would violate Article II of the Outer Space Treaty.

Jurisdiction has a range of meanings from simply the authority to exercise judicial power to being essentially synonymous with sovereignty⁹³¹ however these meanings are overlapping as the authority to exercise power is a key component of sovereignty.⁹³² While it is clear that jurisdiction is an important aspect of international law there exists a surprising lack of monographs dedicated to the subject, at least ‘recently’. Furthermore as, Staker reports, there is a different approach to the issue of jurisdiction in Anglophone scholarship and ‘Continental’ (i.e. European) scholarship. English language texts tend to devote an entire chapter to jurisdiction as a specific issue, whereas Continental texts tend to treat it as an aspect of an issue like statehood or territory.⁹³³

⁹³¹Gabriella Catalano Sgrosso, ‘Legal Status, Rights and Obligations of the Crew in Space’ (1998) 26 J. Space L. 163, 179

⁹³²Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 51

⁹³³Christopher Staker ‘Jurisdiction’ in Malcolm D. Evans eds., *International Law* (4th edn. OUP 2014), 311

Shaw regards jurisdiction as “a central feature of state sovereignty, for it is an exercise of authority which may alter or create or terminate legal relationships and obligations.”⁹³⁴ And describes jurisdiction as concerning “the power of the state under international law to regulate or otherwise impact upon people, property and circumstances and reflects the basic principles of state sovereignty, equality of states and non-interference in domestic affairs.”⁹³⁵

Csabafi says that:

The concept of State jurisdiction may be defined as follows: State jurisdiction in public international law means the right of a State to regulate or affect by legislative, executive or judicial measures the rights of persons, property, acts or events with respect to matters not exclusively of domestic concern. The notion of jurisdiction finds its origin in the concept of territory, the principle of sovereignty equality and non-interference with the domestic affairs of States.⁹³⁶

Territoriality and jurisdiction are so closely linked that they are often taken to be one in the same without much examination.⁹³⁷ Klabbers says that “the *fons et origo* [source and origin] of jurisdiction of states is the principle of territoriality, signifying that sovereignty and territory go hand in hand.”⁹³⁸ Indeed a territorial justification for jurisdiction is a natural outcome of the principle of territorial sovereignty.⁹³⁹ However, as Shaw notes, “while jurisdiction is closely linked with territory it is not exclusively so tied.”⁹⁴⁰

There are circumstances in which a State can exercise jurisdiction outside of its territory. The most relevant to regulation of activities in outer space is known as the nationality principle. As Aust stipulates that “a State can legislate to regulate activities

⁹³⁴Shaw *International Law* (n 872), 469

⁹³⁵*Ibid*, 469

⁹³⁶Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 49

⁹³⁷*Ibid*, 51

⁹³⁸Klabbers *International Law* (n 159), 92

⁹³⁹Shaw *International Law* (n 872), 474-475

⁹⁴⁰*Ibid*, 470

of its nationals abroad” is a well-established principle.⁹⁴¹ Indeed, Shaw argues that nationality is also a logical basis for jurisdiction in an international regime so concerned with sovereignty.⁹⁴² Staker would presumably agree having written that “the territorial principle is a corollary of the sovereignty of a State over its territory.”⁹⁴³ The nationality principle is older than the territoriality principle, however the centrality of territory to the modern (Westphalian) State give pre-eminence to the territoriality principle.⁹⁴⁴ And in that line it is worth noting that most States have a general presumption that their legislation only applies within their territory unless specifically specified otherwise.⁹⁴⁵ Furthermore, “State practice is consistently based upon the premise that it is for the State asserting some novel extraterritorial jurisdiction to prove that it is entitled to do so.”⁹⁴⁶

This seeming limitation on the exercise of extraterritorial jurisdiction is necessary as:

Even if the characterization of international law as fundamentally consensual is accepted it does not follow that a sovereign State is free to do what it wishes. The sovereign equality of States is a fundamental principle of international law. Claims by one State to prescribe rules for persons in another State encroach upon the right of the State where those persons are based to exercise jurisdiction itself over those persons within its territory.⁹⁴⁷

The prevailing theory, which Staker argues is supported by State practice, is that there needs to be a link between the State and the activity it seeks to regulate.⁹⁴⁸ This can be by virtue of having an effect on the State in question or the nationality principle as outlined above or some other basis. Aust says that “international law leaves a fair

⁹⁴¹ Anthony Aust *Handbook of International Law* (2nd edn CUP 2010), 43

⁹⁴² Shaw *International Law* (n 872), 479

⁹⁴³ Staker ‘Jurisdiction’ (n 933), 316

⁹⁴⁴ *Ibid*, 318-319

⁹⁴⁵ *Ibid*, 316-317

⁹⁴⁶ *Ibid*, 315

⁹⁴⁷ *Ibid*, 315

⁹⁴⁸ *Ibid*, 315

measure of jurisdictional discretion to States which can assert jurisdiction if this can be justified by a rule of international law which is generally permissive.”⁹⁴⁹

This is not so much of an issue regarding outer space. There are two, potentially three, avenues for creating a link between States and the activities they seek to regulate. First is Article VI OST which stipulates that States “bear international responsibility” for the activities of their nationals in outer space (jurisdiction via the nationality principle), they are also required to authorise and continually supervise those activities. Second, is via Article VIII OST which stipulates that the State “on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof...” Which, as discussed above is analogous to ocean going ships and makes them ‘vectors of law’ thrust into outer space.⁹⁵⁰ There is a third, albeit more minor basis for a link as according to Article VII the State “that launches or procures the launching of an object into outer space...” and or from where the object is launch, “is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such an object or its component parts...” However, an assertion of the right to jurisdiction does not, by itself, necessarily amount to much. Jurisdiction is about power and “power is the capacity to structure the possible fields of action of others.”⁹⁵¹ It is more than just a right to do something but the ability to do something. A State can assert jurisdiction all it wants but if it does not have the power, the capacity, the ability, to enforce that jurisdiction then it does not mean anything. To paraphrase Joireman regarding property rights, without effective enforcement claims of jurisdiction are worthless.⁹⁵² Weaver provides an illustrative example from the early days of British rule in Southern Africa

⁹⁴⁹Aust *Handbook of International Law* (n 941), 42

⁹⁵⁰Benton, *A Search for Sovereignty* (n 899), 112

⁹⁵¹Weaver *The Great Land Rush* (n 619), 178

⁹⁵²Joireman, *Where There is No Government* (n 688), 5, 25, 153

The Cape of Good Hope Punishment Act, 1836, declared that British subjects who left the colony in pursuit of outside land remained subject to British law. Sovereignty without effective control over a territory proved ridiculous, as the Boers so capably demonstrated by their occupation of the highveld.⁹⁵³

While British law declared that the Boers were subject to British law regardless of where they resided, as they lacked the ability to enforce British law beyond the Cape Colony the Boers were able to effectively escape British jurisdiction. Similar issues plagued US attempts to regulate activities in the Western United States. While the land may have officially been subject to the sovereignty of the United States of America, the jurisdiction of the United States Government did not amount to much as the US was unable to enforce it.⁹⁵⁴

As Crawford writes

international law defines ‘territory’ not by adopting private law analogies of real property but by reference to the extent of governmental power exercised, or capable of being exercised, with respect to some territory and population. Territorial sovereignty is not ownership of but governing power with respect to territory. There is thus a good case for regarding government as the most important single criterion of statehood, since all the others depend upon it.⁹⁵⁵

Staker argues that the principles of international law regarding jurisdiction

“are truly principles, and not rules. The difficulties of applying the principles rigidly have been noted, and are implicit in the nature of jurisdiction. It is not possible to devise strict rules that would divide jurisdiction between sovereign States in any practical manner. The solution to jurisdictional problems has to be found by increasing the sensitivity of States to the constraints imposed by international law, and also to the fact that the interests of other States demand respect... If States wish to do more than they are able to do within the limits of the jurisdiction allowed to them, they must first seek to the agreement and cooperation of other States.”⁹⁵⁶

⁹⁵³Weaver *The Great Land Rush* (n 619), 168

⁹⁵⁴Anderson and Hill, *The Not So Wild West* (n 756), 91-93

⁹⁵⁵Crawford *The Creation of States in International Law* (n 884), 56

⁹⁵⁶Staker ‘Jurisdiction’ (n 933), 333

This is a significant problem for governance of activities in outer space, especially ongoing activities far beyond any location where non-governmental activities have been previously conducted. The ability to ‘continually supervise’ activities in outer space needs to be developed, further, what ‘continually supervise’ means in practice needs to be elaborated by the international community. As argued, having the right to exercise jurisdiction (or more accurately with regards to the Outer Space Treaty, the obligation) does not mean much if the State is unable to effectively do so.

8.8 The Guano Islands Act

A potentially useful historical analogy for space resources is the US’ Guano Islands Act.⁹⁵⁷ The Guano Islands Act was passed in 1856. It was intended to provide protections for US ‘guano miners’ similar to the intentions of the 2015 space resource law. However, the Guano Islands Act, unencumbered by Article II of the Outer Space Treaty did ‘annex’ these islands.

In the 19th century farming was in desperate need of nitrogen rich fertilizer; this was found in the form of ‘guano’ or bird droppings. The best sources of guano were small uninhabitable islands in the Caribbean, the Atlantic and the Pacific.⁹⁵⁸ Guano had been used as a fertilizer by the indigenous peoples of modern Peru possibly for thousands of years.⁹⁵⁹ Initially Peru had a monopoly on the Guano trade but that was not to last, as other sources were located.

The commercial exploitation of the guano islands in the 19th century was the first stage of a fertilizer boom that enabled massive growth of agricultural production and the human population.⁹⁶⁰ Guano was hailed as a potential agricultural miracle, but it was

⁹⁵⁷48 USC Ch. 8: Guano Islands

⁹⁵⁸Daniel Immerwahr *How to Hide an Empire: A Short History of the Greater United States* (The Bodley Head 2019), 46-50

⁹⁵⁹Gregory T. Cushman *Guano and the Opening of the Pacific World: A Global Ecological History* (CUP 2014), 6-8

⁹⁶⁰*Ibid*, 13

expensive as Peru had a monopoly on the source.⁹⁶¹ Though it was recognized that there were probably other sources of Guano and indeed the guano trade started with whalers and other seafarers extracting it from rocks and small islands. They often attempted to keep the knowledge of these islands secret to protect their endeavours,⁹⁶² but they had set off a ‘gold rush’ to find more of these islands and “during the 1850s, American entrepreneurs began combing the earth’s oceans for guano islands so they could bypass the Peruvian monopoly.”⁹⁶³

The US even attempted in 1852 to seize the Lobos Islands off the coast of Peru but backed off in the face of British and Peruvian objections however “the Lobos affair nonetheless set of an international race to claim small oceanic islands.”⁹⁶⁴ The US was not the only country to attempt to seize the Peruvian guano islands.⁹⁶⁵ However, in the United States most of the efforts to secure sources of guano, were private, entrepreneurial efforts but “the United States found itself embroiled in several diplomatic disputes involving guano islands that had been claimed by enterprising American ‘discoverers’ unwilling to wait for government action.”⁹⁶⁶

The Guano Islands Act was prompted by an incident in 1854 where competing mining operations between British, Americans, and Venezuelans resulted in a significant diplomatic incident and the forceable expulsion of the Americans by the Venezuelan armed forces. When the Americans returned to the US, they petitioned Congress for a law protecting the interest of guano ‘miners’ having concluded that it was the lack of backing from the U.S. government that was essentially the cause of their failure. Their

⁹⁶¹Christina Duffy Burnett ‘The Edges of Empire and the Limits of Sovereignty: American Guano Islands’ (2005) 57 *American Quarterly* 779, 782-783

⁹⁶²Cushman *Guano and the Opening of the Pacific World* (1959), 44-45, 81

⁹⁶³*Ibid*, 81

⁹⁶⁴*Ibid*, 81

⁹⁶⁵*Ibid*, 56-57, 72-72

⁹⁶⁶Burnett ‘The Edges of Empire and the Limits of Sovereignty’ (n 961), 783

proposed bill laid the ground work for the Guano Islands Act but its language was watered down from the provision that sovereignty would be automatically extended to any unclaimed guano island which was discovered and occupied unless the President or Congress said otherwise.⁹⁶⁷ Another parallel with the US space resources legislation.

The Guano Island Act declares that:

Whenever any citizen of the United States discovers a deposit of guano on any island, rock, or key, not within the lawful jurisdiction of any other government, and not occupied by the citizens of any other government, and takes peaceable possession thereof, and occupies the same, such island, rock or key may, at the discretion of the President, be considered as appertaining to the United States.⁹⁶⁸

The discoverer, provided they are citizens of the United States, provided Congress allows, may enjoy exclusive access to the island for the purpose of obtaining guano.⁹⁶⁹ US criminal jurisdiction applies.⁹⁷⁰ The President is permitted to use military force to protect the rights of the discoverer to these islands.⁹⁷¹ And the Act stipulates that nothing in the Act “shall be construed as obliging the United States to retain possession of the islands, rocks or keys, after the guano shall have been removed...”⁹⁷² The aim of the act was to provide the US with sources of guano so as to make it affordable.⁹⁷³ “All told, the United States laid claim to 66 islands around the world under the Guano Act, nine of which are still official possessions.”⁹⁷⁴ However, while the US certainly used the Act to project American power and acquire territory the US government denied that “such places had become part of the ‘territorial domain’ of the United

⁹⁶⁷*Ibid*, 783

⁹⁶⁸48 USC Ch 8: Guano Islands §1411

⁹⁶⁹*Ibid*, §1414

⁹⁷⁰*Ibid*, §1417

⁹⁷¹*Ibid*, §1418

⁹⁷²*Ibid*, §1419

⁹⁷³Burnett ‘The Edges of Empire and the Limits of Sovereignty’ (n 961), 780

⁹⁷⁴Cushman *Guano and the Opening of the Pacific World* (n 959), 82

States.”⁹⁷⁵ Indeed, “early drafts contained references to the United States’ ‘sovereignty,’ ‘territory,’ and ‘territorial domain,’ but these words would disappear from the final version. The word ‘appertaining,’ however, survived.”⁹⁷⁶ The discoverer of the guano island would get property rights in the guano and ‘appertaining’ the Island to the US was seen as way to protect the property rights during the extraction process. However, there were disagreements over whether the Guano Islands Act was necessary. Some argued that the Law of Nations ‘protected’ discoveries of citizens already, but the defenders of the Act argued that the act was needed “not to authorize American control of guano islands, but rather to limit the circumstances in which the United States would exert such control.”⁹⁷⁷

Essentially the idea was that the islands would only ‘appertain’ to the US so long as the guano deposit lasted.⁹⁷⁸ Though it was not clear what exactly ‘appertain’ to the US meant.

An opinion provided by the US Attorney General “pointedly omitted any mention of U.S. ‘sovereignty’ over the islands.”⁹⁷⁹ However, later in *Jones v United States* the Supreme Court held that despite being ‘temporary possessions’ Guano Islands were indeed part of the United States although they did not provide any clarity as to what ‘appertain’ means.⁹⁸⁰ However the notion that something could ‘belong’ to the United States yet not be part of the United States would remain.⁹⁸¹ Though this was merely an internal distinction.

⁹⁷⁵Burnett ‘The Edges of Empire and the Limits of Sovereignty’ (n 961), 781

⁹⁷⁶*Ibid*, 784

⁹⁷⁷*Ibid*, 784-785

⁹⁷⁸*Ibid*, 785-786

⁹⁷⁹*Ibid*, 787

⁹⁸⁰*Ibid*, 790-794

⁹⁸¹Raustiala *Does the Constitution Follow the Flag?* (n 897), 74-75

Regarding interpretation of the Guano Islands Act a State Department report from the Office of the Legal Advisor drafted in 1932 concludes that “the only conclusion which can fairly be drawn... is that no one knew what the Guano Act really did mean.”⁹⁸² The report also notes that beyond statements from US government officials regarding the status of these guano islands it is important to note that the US exercised jurisdiction and control over some of these islands under the Act such as in 1858 the use of an armed vessel to protect Americans removing guano from Navassa Island.⁹⁸³ Meaning that there is State practice indicating that the US considers these territories, at least from a perspective of international relations, to be part of the United States and has exercised sovereign powers over them. Additionally the report states that “although the primary purpose of the guano legislation was to enable American citizens to obtain guano, and not territory, nevertheless, it is clear that the United States has the power to acquire territorial sovereignty over islands occupied under the Guano Act.”⁹⁸⁴ (Underlining in original)

Guano and the Guano Islands Act are a potential analogy for the space mining industry. The guano industry was capital intensive and risky, indeed many of the islands claimed under the Guano Islands Act contained the ‘wrong kind’ of guano which was essentially worthless as a fertilizer.⁹⁸⁵ And guano was hailed as a potential miracle product which would boost the world’s food supply helping to propel the industrial revolution and inaugurate “an epoch of peace and prosperity.”⁹⁸⁶ Similar things can and are said about the space resources industry. The ventures proposed are

⁹⁸²United States Department of State – Office of the Legal Adviser *The Sovereignty of Islands Claimed Under the Guano Act and of Northwest Hawaiian Islands Midway and Wake* (1932) Accessed at: <https://evols.library.manoa.hawaii.edu/handle/10524/54209>, 2

⁹⁸³*Ibid*, 37

⁹⁸⁴*Ibid*, 38

⁹⁸⁵Cushman *Guano and the Opening of the Pacific World* (n 959), 83

⁹⁸⁶*Ibid*, 73-74

capital intensive and risky as has been seen with the demise of the pioneering firms Deep Space Industries and Planetary Resources.⁹⁸⁷ As with the guano islands there is a lack of information about the nature of potential targets which could cause problems for the industry.⁹⁸⁸ There has even been a proposal for a ‘Guano Islands Act for the Twenty First Century’.⁹⁸⁹ Indeed, it is possible to see the ghost of the Guano Islands Act in the US legislation regarding space resources. Like the Guano Islands Act the current US law was preceded by a bill worded slightly but not insignificantly differently from the law enacted. The ASTERODS Act (HR 5063)⁹⁹⁰ was the unsuccessful predecessor of the Space Resource Utilization Act of 2015 and explicitly stated that “any resources obtained in outer space from an asteroid are the property of the entity that obtained” them.⁹⁹¹ Which contrasts with the Space Resource Utilization Act which states that US citizens “shall be entitled to any asteroid or space resource obtained...”⁹⁹² and includes a ‘disclaimer of extraterritorial sovereignty.’⁹⁹³ However, unlike the Guano Islands Act, the Space Resource Utilization Act focuses on activity and makes no claim over territory, temporary or ‘appertaining’, in line with the provisions of Article II of the Outer Space Treaty. In the 19th century ‘scramble for resources’ the United States felt that in order to effectively exercise jurisdiction it had to annex territory, in the 21st century it will likely find that it needs international cooperation if it is to avoid violating Article II of the Outer Space Treaty.

⁹⁸⁷Foust, 'The Asteroid Mining Bubble has Burst' (n 78)

⁹⁸⁸Elvis, 'How Many Ore-Bearing Asteroids?' (n 101), 20-21, 25-26

⁹⁸⁹Matthew Johnshoy, 'The Final Frontier and a Guano Islands Act for the Twenty-First Century: Reaching for the Stars without Reaching for the Stars' (2012) 37 J. Corp. L. 717, 721-738

⁹⁹⁰American Space Technology for Exploring Resource Opportunities In Deep Space Act, HR 5063, 113th Congress, (ASTERODS Act)

⁹⁹¹*Ibid*, §51302(a)

⁹⁹²CSLCA (n 48), §51303

⁹⁹³*Ibid*, Sec 403

8.9 Conclusion

Sovereignty and jurisdiction underpinned the international order of States, it is the foundation upon which the system is built. Therefore, the concepts needed to be examined particularly with regards to how they apply to outer space. This chapter examined sovereignty in various eras and forms. It is an evolving concept, however in its current form it is dominated by the territorial variant. This is problematic for outer space as territorial sovereignty is prohibited by virtue of Article II of the Outer Space Treaty. However, as discussed in this chapter, there is ‘personal’ sovereignty, which has its roots in an older conception of political power as being based on personal relationships between ruler and ruled but which nevertheless survives into the modern era as one of the forms of extraterritorial jurisdiction. This is how States exercise control over their subjects at sea and in outer space. However, it has limitations, most notably that it means States have jurisdiction over their nationals but do not have jurisdiction over people who are not their nationals. Further, as discussed in this chapter, jurisdiction is only as effective as the ability of the state to actually ‘control’ those under its jurisdiction. This provides further support for an ‘international’ approach to space resource governance.

Chapter Nine: Space Resource Activities and Space Law

9.1 Introduction

The previous chapter examined the concepts of sovereignty and jurisdiction. It examined sovereignty as an evolving concept although one that is predominantly rooted in its modern territorial variant. However, it also examined the older, ‘personal’ conception of sovereignty, which nevertheless survives into the modern era as one of the forms of extraterritorial jurisdiction. This is how States exercise control over their subjects at sea and in outer space. However, it has limitations, most notably that it means States have jurisdiction over their nationals but do not have jurisdiction over people who are not their nationals. Further, it dealt with the fact that jurisdiction is only as effective as the ability of the state to actually ‘control’ those under its jurisdiction.

The role of this chapter is to discuss the ongoing developments relating to space resources. It examines the legal and policy frameworks in the United States and Luxembourg, as well as the ongoing discussions at the UN and The Hague International Space Resources Governance Working Group. This is important, international law is not static. The actions and views of states push the development of international law, and as this chapter demonstrates, the views of states on the legal issues around space resources are development.

The first section of this chapter examines the relationship between international and national law. This provides an important context. It addresses the fact that states are not able to use their national legislation as an excuse for violating international law. It also addresses the fact that legislation can help drive development of international law

lending importance to the US and Luxembourg space resources legislation beyond its role within those two states.

The next section examines US law and policy on space resources. It takes a look at the failed ASTEROIDS Act which preceded the 2015 law, and had noticeable differences. Then it looks at the 2015 law, examining its provisions and considering its role in the light of Article VI of the Outer Space Treaty. The section looks ahead to legislation under consideration by Congress as a way of examining potential future developments. Then the section looks at Space Force and the Trump administrations space policy. This is relevant not only because it highlights the potential future direction for US space law and policy but also because Space Force highlights one of the potential dangers for the future of space resources, that it could prove to be a source of conflict or at least instability. This enhances the case for an international approach to space resource governance. Finally, the section looks at how international law interacts with the US legal system, this is important because it is likely to be US Courts who determine how exactly to interpret the interaction of the 2015 law and Article II of the Outer Space Treaty.

The next section examines the Luxembourg law on space resources. Luxembourg's law is more comprehensive and was published with an explanatory document, so their intentions are clearer. The next section also looks at how international law works in Luxembourg, which is quite a different situation from the United States and more in line with The Netherlands.

The next section discusses, in detail, the debates that have happened at UNCOPUOS since the enactment of the US law in 2015. It is important that this is undertaken, particularly in this level of detail to demonstrate the development of international

opinion over these recent years. This is, in essence, the evidence for the claim in this work that the status of space resources in international law has, or at least is, changing. Finally, this section looks at the work of The Hague Space Resources Governance Working Group an independent international forum comprised of academics, governments and other stakeholders. They have produced a set of Building Blocks for the Development of an International Framework on Space Resource Activities. This process has been influential in driving discussion at UNCOPOUS and is likely to continue to influence it for some time to come. While it is unlikely that the Building Blocks will be adopted in full, they are still worthwhile examining as this chapter does.

9.2 Relationship between International and National Law

There are two primary competing theories for the relationship between international law and national law. These are known as monism and dualism. Monism presents law as a single order with international law at the apex of this system. The theory behind monism is that “law is a hierarchical system” which creates a single system of norms which all emanate from a higher norm. Dualism, by contrast, stipulates that international and national legal systems are separate and one does not overrule the other.⁹⁹⁴

Neither monism or dualism offer “an adequate account of the *practice* of international and national courts”, furthermore the systems do not come into conflict rather it is generally

a conflict of *obligations*, an inability of the state on the domestic plane to act in the manner required by international law in some respect: the consequence of this will not be the invalidity of state law but the responsibility of the state on the international plane.⁹⁹⁵

Furthermore, legal systems are, in reality, relatively autonomous.

⁹⁹⁴Crawford, *Brownlie's Principles* (n 159), 48-50; Eileen Denza ‘The Relationship Between International and National Law’ in Malcolm D. Evans (eds), *International Law* (4th edn. OUP 2014), 418; Shaw *International Law* (n 872), 93-95

⁹⁹⁵Crawford, *Brownlie's Principles* (n 159), 50

The only theory which can adequately account for that fact is some form of pluralism. Each legal system has almost by definition, its own approach to the others (though in practice there is much borrowing.) To talk of ‘national law’ is to generalize; but as soon as one asks what approach a given system (international law, English law, French law...) takes to another, the mist clears: it is possible to state the position with clarity and to understand that each system reserves to itself the authority to determine for the time being the extent and terms of interpretation of laws and related issues of the separation of powers.⁹⁹⁶

A state cannot use its national law or lack of national law as an excuse for breaching its international legal obligations. This has been consistently endorsed by international courts and tribunals.⁹⁹⁷ Generally speaking states are obliged to bring their national laws into line with their obligations under international law. Failure to do so is not by itself a breach of international law, that only arises when the state “fails to observe its obligations on a specific occasion.”⁹⁹⁸ National courts need to determine whether and how to bring international law into consideration regarding the issue before them. This is usually a constitutional question and can be different for customary international law and treaty law.⁹⁹⁹

the role of internal legal rules is vital to the workings of the international legal machine. One of the ways that it is possible to understand and discover a state’s legal position on a variety of topics important to international law is by examining municipal laws. A country will express its opinion...

on vital international matters “...through the medium of its domestic law-making. Thus, it is quite often that in the course of deciding a case before it, an international court will feel the necessity to make a study of relevant pieces of municipal legislation.”¹⁰⁰⁰

⁹⁹⁶*Ibid*, 50

⁹⁹⁷Shaw *International Law* (n 872), 95; Crawford, *Brownlie’s Principles* (n 159), 51

⁹⁹⁸Crawford, *Brownlie’s Principles* (n 159), 52

⁹⁹⁹*Ibid*, 55-57

¹⁰⁰⁰Shaw *International Law* (n 872), 97

Furthermore, legislation can fall under the ‘subsequent practice’ category under VCLT and “specifically address points of interpretations”.¹⁰⁰¹ Therefore, it is vital to examine national legislation as it can have consequences for the interpretation of treaties. So the US and Luxembourg space resource activities laws are helping to develop the interpretation of the Outer Space Treaty.

9.3 US Law and Policy

Perhaps unsurprisingly the United States is a leader in space law and policy and within the field of space resources this has proven to be no different. This section will explore the US law and policy relating to space mining, starting with 2014’s failed bill through to Space Force and some of the current legislative proposals. It will also look at how international law works in the US legal system.

9.3.1 ASTEROIDS ACT

The American Space Technology for Exploring Resources Opportunities in Deep Space Act (ASTEROIDS Act), or HR 5063¹⁰⁰², was introduced into the US House of Representatives in 2014. It was the first major attempt to provide a legal process for the acquisition of property rights over extracted space resources in US law. The bill failed, but was resurrected, albeit after some alteration, in 2015 as part of the wider U.S. Commercial Space Launch Competitiveness Act.¹⁰⁰³ The bill was intended to promote the development of the US commercial asteroid mining industry, and provide and protect property rights over extracted resources to American companies who extracted them. It also would have provided a mechanism for foreign companies to obtain similar rights by voluntarily submitting “to the subject matter and personal

¹⁰⁰¹Gardiner *Treaty Interpretation* (n 26), 257

¹⁰⁰²ASTEROIDS Act (n 990)

¹⁰⁰³CSLCA (n 48)

jurisdiction of the courts of the United States.”¹⁰⁰⁴ It also states that this should be done in accordance with the international obligations of the United States.¹⁰⁰⁵

9.3.2 Title IV CSLCA

The ASTEROIDS Act was resurrected, at least in part, in Title IV of the US Commercial Space Launch Competitiveness Act which became law in November 2015. The Commercial Space Launch Competitiveness Act covers a range of space related topics, but Title IV or the Space Resource Exploration and Utilization Act of 2015, is focused specifically on space mining. This is the first distinction between Title IV and the ASTEROIDS Act which had a specific focus on asteroid resources. There is some retention of this in the definition section which has both asteroid resource and space resource. However, by the definitions in Title IV, asteroid resources are space resources and there is no distinction between the two made elsewhere in the legislation. Beyond that Title IV drops the mechanism for foreign companies to obtain property rights over space or asteroid resources by voluntarily submitting “to the subject matter and personal jurisdiction of the courts of the United States” found in the ASTEROIDS Act. Only United States Citizens and companies can benefit directly from Title IV. Title IV also includes a disclaimer explicitly stating that it does not constitute an assertion of “sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”¹⁰⁰⁶ This was included to deflect any claims that it violates Article II of the Outer Space Treaty.

The Space Resource Exploration and Utilization Act of 2015 or Title IV of the Commercial Space Launch Competitiveness Act of 2015 was enacted to enable the US to develop a framework for regulating space resource activities, and should be seen

¹⁰⁰⁴ASTEROIDS Act (n 990), §51303(2)(c)

¹⁰⁰⁵*Ibid*, §51301(2)(3)(4), §51302(b)

¹⁰⁰⁶CSLCA (n 48), Title IV, §51303 Sec. 403

as part of the US' understanding of its obligations to 'authorise and supervise' the activities of their nationals in outer space as stipulated under Article VI of the Outer Space Treaty. This piece of legislation has provoked considerable controversy as it seemingly conflicts with Article II of the Outer Space Treaty which prohibits national appropriation of outer space, the Moon, and any other celestial body by means of sovereignty, use, occupation, or any other means. The argument essentially goes that under the Act as the US grants itself the right to grant property rights over space resources to US companies the Act could be seen as US trying to claim jurisdiction over space resources, and by extension, the bodies they are found in.¹⁰⁰⁷

The Act does require the "accordance with the international obligations of the United States"¹⁰⁰⁸ and make the disclaimer that "the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body."¹⁰⁰⁹ However, some such as Fabio Tronchetti, are sceptical of the value of such assurances:

references to 'consistency with international obligations' are vaguely phrased and such a consistency is to be evaluated from a national, US, perspective, which may not be shared, or agreed to, by other States Parties to the UN space treaties.¹⁰¹⁰

There is also the additional issue regarding enforcement of the Act. The Act clearly only applies to citizens of the United States or US companies, and clarifies that the Act is not intended to extend US jurisdiction to any celestial body.¹⁰¹¹ Therefore, enforcement of the property rights protections supposedly provided by this Act will potentially be problematic to action against foreign nationals or corporations, especially if such States were to take the view that the Act is an illegitimate act of US

¹⁰⁰⁷Tronchetti, 'The Space Resource Exploration and Utilization Act' (n 50), 8

¹⁰⁰⁸CSLCA (n 48), § 51302(a)(2), § 51302 (a)(3)

¹⁰⁰⁹*Ibid.*, § 403

¹⁰¹⁰Tronchetti, 'The Space Resource Exploration and Utilization Act' (n 50), 7

¹⁰¹¹CSLCA (n 48), Title IV

unilateralism in space, a view which has been expressed at UNCOPUOS. This would reduce the effectiveness of the act considerably. This is further complicated by the lack of any dispute resolution mechanisms in the Outer Space Treaty, and the ‘inadequacy’ of existing international dispute resolution mechanisms. As will be discussed in further detail below, enforcement is key to the effectiveness of a property rights regime, so this may be a particular problem, especially if the ‘national’ approach is the dominant model take to regulating space resource activities.

However, national legislation is necessary, as part of the Article VI obligation to ‘authorise and supervise’, and therefore these inadequacies are not an attack on national legislation in and of itself but rather an argument for embedding national legislation in some sort of international framework to ensure, at the very least, mutual recognition, facilitate cooperation and the avoidance of ‘harmful interference.’ Furthermore, the development of national legislation allows for experimentation in the regulation of space resource activities and the development of a property rights regime, which is important given the novelty of space resource activities, it is premature to expect too much uniformity. While the second national legislation on space resource activities is in principle similar to that of the United States, Luxembourg has nevertheless provided the world with a second ‘model’ for space resource legislation.

9.3.3 American Space Commerce Free Enterprise Act

In 2018 the US House of Representatives (hereinafter US House) passed the American Space Commerce Free Enterprise Act (H.R. 2809)¹⁰¹² however it was not voted on by US Senate. In July 2019 it was reintroduced into the US House¹⁰¹³ as H.R. 3610

¹⁰¹²American Space Commerce Free Enterprise Act, HR 2809, 115th Congress

¹⁰¹³Marcia Smith, ‘Babin Reintroduces Commercial Space Bill’ (*SpacePolicyOnline.com*, 3 July 2019) <https://spacepolicyonline.com/news/babin-reintroduces-commercial-space-bill/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+Spacepolicyonline+%28SpacePolicyOnline+News%29&fbclid=IwAR1IkatuBmaMcDLs1Hay54GaEpZem5xZX54S52ebD8C2nOPjJ38Y6KnJ-cY> accessed 10 January 2020

although the text (as of 13 July 2019) remains unchanged.¹⁰¹⁴ The US Senate has its own ‘competing’ bill, the Space Frontier Act. Most of the political fight is surrounding whether the US Department of Commerce or the Federal Aviation Administration should have primary responsibility for the supervision of commercial space activities. However, for the purposes of this work the key difference is that the American Space Commerce Free Enterprise Act contains provisions on space resource activities whereas neither version of the Space Frontier Act contain any such provisions.

Section 2(b) stipulates that US citizens are free to utilize space resources without condition or limitation except as required by the national security of the United States and the international obligations of the US under the Outer Space Treaty. However, the US government shall interpret these obligations so as to “minimize regulations and limitations on the freedom of United States non-governmental entities...”¹⁰¹⁵

Furthermore, the bill stipulates that the President shall protect US entities engaged in the exploitation of space resources “from acts of foreign aggression and foreign harmful interference”¹⁰¹⁶ as well as protect the “ownership rights” of US entities which have “obtained space resources.”¹⁰¹⁷ Also, the bill, if passed into law, would explicitly reject the notion that outer space is a global commons.¹⁰¹⁸

9.3.4 Space Force and President Trump’s Space Policy

President Trump has had a rather vocal space policy. His primary focus has been on space security, specifically his efforts to create a ‘Space Force’ as separate branch of the United States armed forces, though as evidenced by the statements made by key members of his administration this is not his only focus. Considering the positions of

¹⁰¹⁴American Space Commerce Free Enterprise Act of 2019, HR 3610, 116th Congress

¹⁰¹⁵American Space Commerce Free Enterprise Act (n 1012) Sec. 2(b)(3)

¹⁰¹⁶*Ibid*, §80111(1)

¹⁰¹⁷*Ibid*, §80111(2)

¹⁰¹⁸*Ibid*, §80308

the Trump administration are worthwhile for several reasons. The United States is one of, if not the leading ‘space powers’ and therefore the policy direction of the United States will have a significant influence on the development of international norms. Furthermore, as discussed, the statements made by government officials, particularly elected representatives like the President and Vice-President, as well as official policy documents like the US’ National Space Strategy can be statements of *opinio juris* and/or evidence of state practice which can help to drive the development of customary international law.

President Trump’s space policy, like most of his policies, are framed through ‘America First’ narrative that is so central to his presidency. A key theme of his ‘America First’ space policy is that the United States needs to be ‘dominant’ in outer space just as it is on earth,¹⁰¹⁹ economically as well as militarily. Vice President Pence has said that the Trump administration

will promote regulatory, technological, and educational reforms to expand opportunities for American citizens and ensure that the U.S. is at the forefront of economic development in outer space. In the years to come, American industry must be the first to maintain a constant commercial human presence in low-Earth orbit, to expand the sphere of the economy beyond this blue marble.¹⁰²⁰

A key aspect of this is an effort to, in their words, update out of date regulations¹⁰²¹ and remove unnecessary regulations.¹⁰²² While space resource activities have not, as

¹⁰¹⁹Remarks by Vice President Pence at the Fourth Meeting of the National Space Council (23 October 2018)

<https://www.whitehouse.gov/briefings-statements/remarks-vice-president-pence-fourth-meeting-national-space-council/>; President Donald J. Trump is Unveiling an America First National Space Strategy (23 March 2018) <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-unveiling-america-first-national-space-strategy/>; Remarks by Vice President Pence at the Satellite 2019 Conference (6 May 2019) <https://www.whitehouse.gov/briefings-statements/remarks-vice-president-pence-satellite-2019-conference/>

¹⁰²⁰America Will Return to the Moon—and Go Beyond (4 October 2019) <https://www.whitehouse.gov/articles/america-will-return-moon-go-beyond/>

¹⁰²¹Remarks by Vice President Pence (n 1019); Remarks by Vice President Pence at the Fifth Meeting of the National Space Council (26 March 2019) <https://www.whitehouse.gov/briefings-statements/remarks-vice-president-pence-fifth-meeting-national-space-council-huntsville-al/>

¹⁰²²Remarks by Vice President Pence at the Satellite 2019 Conference (n 1019)

yet, been a key feature of the Trump administration's space policy, it has been discussed by both the President and the Vice President. A statement released by the White House stipulated that in addition to being vital to national security,

space is also invaluable to American private industry, which is developing revolutionary technologies that will utilize space for exploration, resource extraction, and tourism.¹⁰²³

Lunar mining has been discussed by Vice President Pence as part of plans for a return to the Moon. At the 5th meeting of the National Space Council he said that,

we're going back to the Moon with new ambitions, not just to travel there, not just to develop technologies there, but also to mine oxygen from lunar rocks that will refuel our ships; to use nuclear power to extract water from the permanently shadowed craters of the South Pole.¹⁰²⁴

This is often presented as part of the 'frontier narrative' of the history and destiny of the United States, at an early meeting of the National Space Council Vice-President Pence said that

Not long ago, no one would have dreamt of landing a vehicle on an asteroid to mine its minerals... But today, these are all emerging businesses. And like the railroads that opened up the American West to explorers and entrepreneurs, these technologies will extend the range of American action and values into new worlds, and usher in a new era of job creation and innovation driven by space.¹⁰²⁵

The Trump administration recognizes the strategic potential of space resources, as well as their economic and scientific value.¹⁰²⁶ Which is part of the interest in creating the Space Force, to protect American interests in space. As Vice-President Pence has said

Well, what it means... is that we're going to protect American interests in space... But also, what the President's vision is, is that we stand up a Space Force that very much — similar to the way that the Air Force

¹⁰²³President Donald J. Trump is Building the United States Space Force for a 21st Century Military (9 August 2018) <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-building-united-states-space-force-21st-century-military/>

¹⁰²⁴Remarks by Vice President Pence at the Fifth Meeting of the National Space Council (n 1021)

¹⁰²⁵Remarks by Vice President Pence at Second Meeting of the National Space Council (21 February 2018) <https://www.whitehouse.gov/briefings-statements/remarks-vice-president-pence-second-meeting-national-space-council/>

¹⁰²⁶Remarks by Vice President Pence at the Fifth Meeting of the National Space Council (n 1021)

was launched after World War II — will evolve into ensuring that America remains as dominant in outer space militarily as we are here on Earth. And that will be the project of the Space Force going forward.¹⁰²⁷

Furthermore, the administration has repeatedly stated that they view space as a “warfighting domain” no different from land, air and sea. They argue that the United States will be and needs to be dominant in space ‘just as it is on Earth’.¹⁰²⁸ While the Trump administration states they do not see a need to amend the Outer Space Treaty¹⁰²⁹ in order to accomplish their aims they do stipulate that “the rules and values of space, like every great frontier, will be written by those who have the courage to get there first and the commitment to stay.”¹⁰³⁰

9.3.5 International Law and the US Legal System

The US Constitution stipulates that treaties made under the “Authority of the United States” shall be regarded as being the supreme Law of the Land on par with the ‘Laws of the United States’¹⁰³¹ This means that “unless treaties are contrary to the constitution, they are equal in status to congressional legislation.”¹⁰³² The US President has the power to make treaties although the approval of two-thirds of the Senate is required for ratification.¹⁰³³ The US Congress has the power to enact all

¹⁰²⁷Interview of Vice President Pence by Robert Costa at the Washington Post’s Space Summit ‘Transformers: Space’ (23 October 2018) <https://www.whitehouse.gov/briefings-statements/interview-vice-president-pence-robert-costa-washington-posts-space-summit-transformers-space/>

¹⁰²⁸‘President Donald J. Trump is Establishing America’s Space Force’ (19 February 2019) <https://www.whitehouse.gov/briefings-statements/president-trump-establishing-americas-space-force/>; Remarks by Vice President Pence (n 1019); President Donald J. Trump is Unveiling an America First National Space Strategy (n 1019); Remarks by Vice President Pence at the Satellite 2019 Conference (1019); ‘President Donald J. Trump Is Launching America’s Space Force’ (23 October 2018) <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-launching-americas-space-force/>

¹⁰²⁹Interview of Vice President Pence’ (n 1027)

¹⁰³⁰Remarks by Vice President Pence at the Fifth Meeting of the National Space Council (n 1021); Remarks by Vice President Pence at the Satellite 2019 Conference (n 1019)

¹⁰³¹The Constitution of the United States of America, Article VI, para 2

¹⁰³²John E. Nowak and Ronald D. Rotunda, *Principles of Constitutional Law* (4th edn, West 2010), 124

¹⁰³³US Constitution (n 1031), Article II, Section 2, Para 2

legislation that is necessary to implement and enforce treaties,¹⁰³⁴ this is known as the ‘necessary and proper clause’.¹⁰³⁵

While treaties are regarded as being on par with the ‘laws of the United States’ as enacted by Congress the US Supreme Court distinguishes between ‘self-executing’ and ‘non-self-executing’ treaty provisions. It does so on a provision-by-provision basis. “If a treaty provision is non-self-executing, it will not be given effect by U.S. courts unless and until it is implemented by Congress.”¹⁰³⁶ Additionally, “if a treaty regulates a matter falling within an area of exclusive congressional authority, it will be treated as non-self-executing.”¹⁰³⁷

US courts follow a canon of statutory interpretation known as the *Charming Betsy* Canon named after the 1804 Supreme Court case *Murray v. The Schooner Charming Betsy*. This essentially stipulates that Acts of Congress are to be interpreted, where possible, so as to not violate international law.¹⁰³⁸ For customary international law Bradley argues that this only applies where a statute is ambiguous; it is for treaties where Congress “must evidence a clear intent to abrogate...”¹⁰³⁹ Furthermore, Bradley says that

there is some question about whether and to what extent the *Charmin Betsy* canon should apply when the statutory interpretation in question is being advocated by the executive branch. The canon is designed, at least in part, to ensure that the United States does not breach international law without the political branches having expressly made the decision to do so.¹⁰⁴⁰

¹⁰³⁴*Ibid*, Article I, Section 8, Para 18

¹⁰³⁵Nowak and Rotunda, *Principles of Constitutional Law* (n 1032), 123

¹⁰³⁶Bradley, *International Law in the U.S. Legal System* (n 160), 41

¹⁰³⁷*Ibid*, 49

¹⁰³⁸*Ibid*, 15-16

¹⁰³⁹*Ibid*, 16-17

¹⁰⁴⁰*Ibid*, 17

US courts apply the ‘last-in-time rule’ which stipulates that an Act of Congress overrides a preceding treaty, it is also possible for a treaty to override a preceding Act of Congress although this has been rare in practice.¹⁰⁴¹

Acts of Congress passed after the date of the treaty, the court held, control over the treaty terms. Similarly, a self-executing treaty is valid as domestic law and takes precedence over a federal law enacted earlier. In short, the last expression of the sovereign will control.¹⁰⁴²

Though, of course, this rule

does not relieve the United States of responsibility under international law for complying with a treaty. As a result, if a court applies a statute to override an earlier treaty, the United States may be placed in breach of its international obligations.¹⁰⁴³

Which is why courts will try to interpret Acts of Congress in conformity with international law when possible. Furthermore, when interpreting treaties, U.S. courts taking into account that treaties, unlike legislation, involve commitments to other nations. Therefore, they attempt to take into consideration the “shared expectations” of the parties to the treaty. The courts also give consideration to the understanding that the Senate and the President had of the meaning of the treaty at time of ratification.¹⁰⁴⁴

Bradley argues that customary international law cannot be regarded as ‘self-executing’ federal law, it is not accorded the same status as ‘treaty law’ from the perspective of the constitution but has been applied by courts as part of the ‘common law’. Though he grants that CIL can be used as an aid to interpret ambiguities.¹⁰⁴⁵

However, Jens David Ohlin takes issue with this view. Ohlin argues that the ‘New realists’ (of which he places Bradley as a leader) argue that Federal courts are not empowered to make ‘common law’ and that without a ‘sovereign source’ such as

¹⁰⁴¹*Ibid*, 52-54

¹⁰⁴²Nowak and Rotunda, *Principles of Constitutional Law* (n 1032), 127

¹⁰⁴³Bradley, *International Law in the U.S. Legal System* (n 160), 54-55

¹⁰⁴⁴*Ibid*, 66-69

¹⁰⁴⁵*Ibid*, 140-167

Congress acting, customary international law therefore cannot be considered part of US Federal Law. However Ohlin argues that while generally Federal common law ‘doesn’t exist’, it does with regards to things like customary international law because foreign relations are part of the powers of the Federal Government and if each state was able to develop its own interpretation of common law then it would become impossible for the US to effectively conduct international relations.¹⁰⁴⁶

Finally, US statutory interpretation takes a presumption against extraterritorial application acts of Congress.¹⁰⁴⁷

The presumption against extraterritoriality is a ‘long standing principle of American law’ that ‘serves to protect against unintended clashes between our laws and those of other nations which could result in international discord.’¹⁰⁴⁸

However, as Bradley notes, “it has long been accepted that nations have broad authority to regulate the conduct of their own nationals around the world.”¹⁰⁴⁹

9.4 Luxembourg

Luxembourg is the second country to have enacted space resources legislation. This section looks at that law and then the role of international law in the Luxembourg legal system.

9.4.1 Law on the Exploration and Use of Space Resources

Luxembourg’s Law on the Exploration and Use of Space Resources came into effect on 1 August 2017. They first published a draft version of this law in November 2016. Luxemburg has embraced space resource activities in a big way, as in addition to this law they have also invested over 200 million Euros in the industry.¹⁰⁵⁰

¹⁰⁴⁶Ohlin *The Assault on International Law* (n 311), 15-30

¹⁰⁴⁷Bradley, *International Law in the U.S. Legal System* (n 160), 179-181

¹⁰⁴⁸*Ibid*, 181

¹⁰⁴⁹*Ibid*, 189

¹⁰⁵⁰Scoles 'Luxembourg's Bid to Become the Silicon Valley of Space Mining' (n 75); Morris 'Luxembourg to Invest \$227...' (n 75)

Article I declares that “space resources are capable of being appropriated.” Although it is notable that unlike the US law it does not provide a definition of space resources, however the explanatory document published with the initial draft of the law took the definition found in the US law to be the ‘common definition.’ This definition is that a space resource is an abiotic resource that can be found in situ in outer space including water and minerals. It is worth noting that this is the definition adopted by the Hague Space Resources Governance Working Group in their Building Blocks for an International Framework on Space Resources.¹⁰⁵¹ The US law also provides the term asteroid resource, but the definition of that, as yet, is no different from space resource except for the fact that an asteroid resource is found in an asteroid.

The licence itself can only be granted to legal persons (i.e. companies) having its registered office in Luxembourg. A licence is non-transferable and needs to be used within 36 months of being granted (presumably this just means operations need to have started within 36 months). Furthermore, in order to obtain a licence, the applicant must demonstrate, among other things, a “robust scheme of financial, technical, and statutory procedures...” and plans for the exploration, utilization and commercialization phases of operations. Key sections of the Luxembourg law are backed up by criminal penalties, which range from fines of varying degrees and can include a prison term of between eight days and five years depending on which sections of the law have been infringed.

The government of Luxembourg published an explanatory statement alongside their draft law which is worth considering. First, they articulated that the object of the law is to develop “a legal and regulatory framework providing for legal certainty as to the ownership of minerals and other valuable space resources identified in particular on

¹⁰⁵¹The Hague Working Group Building Blocks on Space Resource Activities (n 61)

asteroids.”¹⁰⁵² They state that they hope that this will give rise to a new industry which will stimulate economic growth and offer new horizons in space.¹⁰⁵³

Regarding the provisions of the law itself they also made a point of stipulating that the “relevant legal framework shall be put in place in strict compliance with the international obligations of Luxembourg.”¹⁰⁵⁴ Though it is worth noting that the wording of Article I changed from the draft law published on 11 November 2016 to the approved law of 20 July 2017. In the 2016 draft, Article 1 said that “space resources are capable of being appropriated in accordance with international law.”¹⁰⁵⁵ In the 2017 law, Article 1 merely says “space resources are capable of being appropriated.” Although Article 2(3) does stipulate that activities can only be carried out in accordance with “the international obligations of Luxembourg.”¹⁰⁵⁶

Articles 1 and 2 are where the explanation of the justification for the law is laid out. Luxembourg argues that the basis for property rights over space resources can be found in the Civil Code which originated in 1804 and is inspired by 18th century French legal thinking. The analogy is made with the high seas. “Space resources are appropriable, in the same way as fish and shellfish are, but celestial bodies and asteroids are not, just like the high sea is not.”¹⁰⁵⁷ The argument is that the approach is in accordance with the “basic principles of French-inspired property law” as well as being consistent with international law.¹⁰⁵⁸ The argument advanced is that the Outer Space Treaty is silent on the question of resources and Luxembourg’s law only

¹⁰⁵²Luxembourg Ministry of the Economy ‘Draft Law on the Exploration and Use of Space Resources – Explanatory Statement’ (11 November 2016) <https://gouvernement.lu/dam-assets/fr/actualites/communiqués/2016/11-novembre/11-presentation-spaceresources/Draft-law-space_press.pdf>, 1

¹⁰⁵³*Ibid*, 2

¹⁰⁵⁴*Ibid*, 1

¹⁰⁵⁵*Ibid*, 13

¹⁰⁵⁶Luxembourg Space Resources Law (n 74)

¹⁰⁵⁷Explanatory Statement (n 1052), 3-4

¹⁰⁵⁸*Ibid*, 4

addresses resources, there is no attempt to allow, permit or even suggest the appropriation of celestial bodies or the extension of sovereignty or territory. “Only space resources and the appropriation of such resources are addressed here.”¹⁰⁵⁹ Additionally, the freedom of use in Article I of the Outer Space Treaty allows for the appropriation of space resources under the scope of the term ‘use’.¹⁰⁶⁰ As the explanatory note states

the analogy with the high sea and mining advocates in favour of the appropriation of resources, and Article 1 is furthermore perfectly in line with the principle of the non-appropriation of outer space and celestial bodies as set out in Article II of the Treaty.¹⁰⁶¹

Adding that

The concept of appropriation includes all of the classic attributes of the right of ownership and in particular the right to possess, transport, use or sell resources in accordance with the provisions of this draft law and those of the international texts that are applicable here.¹⁰⁶²

Luxembourg also recognizes that as a consequence of Article VI of the Outer Space Treaty any space resource activity carried out by a ‘non-governmental entity’ requires authorisation and supervision and therefore Article 2 requires Luxembourg based entities to obtain authorisation.¹⁰⁶³

9.4.2 International Law in Luxembourg

The relationship between domestic law and international law in Luxembourg is more straightforward than in the United States. As Jörg Gerkrath has argued this may be because “Luxembourg’s Constitution has never been based on a conception of absolute sovereignty...” indeed “One of the particular characteristics of Luxembourg’s domestic legal order lies in the fact that its very existence results from

¹⁰⁵⁹*Ibid*, 4

¹⁰⁶⁰*Ibid*, 4-5

¹⁰⁶¹*Ibid*, 5

¹⁰⁶²*Ibid*, 6

¹⁰⁶³*Ibid*, 6

international law.” International law is recognized as being central to Luxembourg’s existence as a state and Luxembourg’s courts have had no issue granting international law pre-eminence.¹⁰⁶⁴ While the constitution itself does not contain any provision granting international law primacy, “well settled” case law, academic position and the position of the *Conseil d’État* holds that “self-executing international treaties enjoy full primacy with regard to the provisions of internal law, including the Constitution itself.”¹⁰⁶⁵ In the event that an international treaty conflicts with the provisions of a subsequent law, international law prevails, there is not an equivalent to the United States’ ‘last-in-time’ rule.¹⁰⁶⁶ “Once approved, the respective international norms enjoy, in the pure monistic tradition, full primacy over rules of domestic law, even of constitutional value.”¹⁰⁶⁷ Treaties are operative once they have been approved and formally published. The constitution makes no reference to international customary law.¹⁰⁶⁸ Similarly, The Netherlands constitution also makes no mention of the effect of custom on domestic law, and Luxembourg has been “strongly influenced” by the constitutional traditions of The Netherlands.¹⁰⁶⁹ In The Netherlands international customary law does not in principle, prevail over domestic legislation, the Constitution or the 1954 Charter for the Kingdom. Though it has been incorporated on a *sui generis* basis where the norm in question is considered self-executing and the courts have taken it into account when relevant.¹⁰⁷⁰

¹⁰⁶⁴Jorg Gerkrath ‘The Constitution of Luxembourg in the Context of EU and International Law as ‘Higher Law’ in Albi A., Bardutzky S. (eds) *National Constitutions in European and Global Governance: Democracy, Rights, the Rule of Law* (T.M.C. Asser Press 2019), 1.3.2 para 1-2

¹⁰⁶⁵*Ibid*, 1.3.1 para 2

¹⁰⁶⁶*Ibid*, 1.3.1 para 4-5

¹⁰⁶⁷*Ibid*, 1.3.1 para 7

¹⁰⁶⁸*Ibid*, 3.1.1 para 3-4

¹⁰⁶⁹*Ibid*, 1.1.1 para 4

¹⁰⁷⁰Crawford, *Brownlie’s Principles* (n 159), 92-93

9.5 UNCOPUOS

The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is the leading international forum for space governance. It has two subcommittees a Scientific and Technical Subcommittee and Legal Subcommittee. The Legal Subcommittee has been responsible for developing the five ‘UN space law treaties’ as well as a host of declarations and General Assembly Resolutions on space governance issues. Unsurprisingly, in the wake of the passage of the US space resources legislation in November 2015 the UNCOPUOS Legal Subcommittee began discussing the issue of space resources. Over four sessions from April 2016 to April 2019 the international conversation has developed significantly and will be discussed.

At the session of the Legal Subcommittee of UNCOPUOS in 2016, initial opposition was raised to Title IV of the US Commercial Space Launch Competitiveness Act. The Russian delegation was the first to express disapproval, stating that UNCOPUOS is the main forum for the creation and discussion of space law. They further stated that the unilateral adoption of national legislation is unacceptable as the views of all states need to be accounted for, something than can only happen via UNCOPUOS.¹⁰⁷¹ Russia further declared that UNCOPUOS should look to the Moon Agreement for a mechanism for dealing with the question of space resources, and stipulated that space mining poses significant risks for all of humanity and therefore it is necessary to be discussed at UNCOPUOS. To that end Russia proposed creating a space resources working group within the Legal Subcommittee of UNCOPUOS.¹⁰⁷² It is worth putting some context to the Russian use of the word ‘unilateral’ as the Russian government’s

¹⁰⁷¹Russian Delegation, UNCOPUOS Legal Subcommittee, 4 April 2016 1052-1055 (based on authors notes from participating as part of delegation for permanent observer the Space Generation Advisory Council, all times in GMT – digital recordings are available - <https://www.unoosa.org/oosa/audio/v2/meetings.jsp?lng=en>)

¹⁰⁷²Russian Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1104-1114

post-Soviet self-image is as the protector of international law against a unilateralist and hegemonic United States, therefore there is potentially more to Russia's description of the US space resources legislation than meets the eye.¹⁰⁷³

The Belgian delegation also expressed concerns about the new US law. They stipulated that outer space natural resources cannot be appropriated by the unilateral extension of national jurisdiction.¹⁰⁷⁴ Further expressing that they do not view natural resources and celestial bodies as being separable, appropriation of natural resources is therefore appropriation of the celestial body.¹⁰⁷⁵ Mexico did not speak directly in opposition to the US law but they did express concern that the first come first served approach would be applied to space resource activities as this ill-serves developing states. They also urged the ratification of the Moon Agreement as well as the other four space law treaties.¹⁰⁷⁶

A few other delegations made comments in the 2016 session as well at the United States. Luxembourg stated that they were considering a space resource activities law and would take into consideration the views expressed during this session of the Legal Subcommittee of UNCOPUOS.¹⁰⁷⁷ The Netherlands delegation stated that they would introduce the work of The Hague Space Resources Governance Working Group, who at that time had yet to have their first formal meeting as a Working Group.¹⁰⁷⁸ The Italian delegation expressed their confidence that the United States would apply the space resources legislation in accordance with their obligations under international law.¹⁰⁷⁹

¹⁰⁷³Lauri Mälksoo *Russian Approaches to International Law* (OUP 2017), 148-149

¹⁰⁷⁴Belgian Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1006-1008

¹⁰⁷⁵Belgian Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1028-1029

¹⁰⁷⁶Mexican Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1133-1136

¹⁰⁷⁷Luxembourg Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1042-1045

¹⁰⁷⁸Netherlands Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1120-1121

¹⁰⁷⁹Italian Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1452-1453

The US delegation stated that there had been an inaccurate characterization by Russia of the US Space Resources Act. They further stated that the law has been general misunderstood. The law authorises space activities, it does not claim sovereignty over space or celestial bodies and is consistent with US obligations under international law.¹⁰⁸⁰ Furthermore, the US stipulated that the Act operates within the framework of the Outer Space Treaty and will be interpreted and applied in accordance with international law.¹⁰⁸¹ Which as was discussed above is the presumption taken in US statutory interpretation anyway¹⁰⁸², as well as being stipulated in the Act itself.¹⁰⁸³ The US delegation also asserted that the US has always been a strong supporter of the non-appropriation principle and that this law does not change the US position. Finally, they stated that the implementation of the Act had to be a ‘unilateral action’ as there is no multilateral mechanism for space resource management and implementation of national legislation is by its very nature a unilateral action.¹⁰⁸⁴

There was a general sense that more information and discussion regarding space resource activities was necessary, as expressed in the final report from the 2016 session. While there was some opposition to the ‘unilateral’ approach taken by the United States there was no real opposition to the concept of space resource utilization. Furthermore, there was a general acceptance of the necessity of giving reassurance or certainty to non-governmental entities that they would be able to obtain property rights in some form or another over their extracted resources. The main points of discussion were the mechanism for doing this and how to implement it. Broad support for a multilateral approach was expressed even among those delegations who accepted that

¹⁰⁸⁰US Delegation, UNCOPUOS Legal Subcommittee, 4 April 2016 1047-1051

¹⁰⁸¹US Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1116-1123

¹⁰⁸²Bradley, *International Law in the U.S. Legal System* (n 160), 15-16

¹⁰⁸³CSLCA (n 48), Title IV, §51303 Sec. 403

¹⁰⁸⁴US Delegation, UNCOPUOS Legal Subcommittee, 5 April 2016 1116-1123

national legislation prior to the implementation of a multilateral approach was legitimate. References were made to the international fishing regime as well as that for seabed mining. Developing states also expressed concerns that they would be ‘left behind’ particularly if a ‘first come first served’ approach was adopted.¹⁰⁸⁵

At the UNCOPUOS Legal Subcommittee in 2017 the topic of space resources featured on the agenda under item 14 “general exchange of views on potential legal models for activities in exploration, exploitation and utilization of space resources.”¹⁰⁸⁶ Space resource activities was also the topic of choice for the joint European Centre for Space Law (ECSL) and International Institute of Space Law (IISL) symposium traditionally held during the Monday afternoon of the first week of the Legal Subcommittee (although it is, of course, not formally part of the proceedings).

Belgium repeated and expanded upon their concerns and criticisms from 2016. They stated concern about the unilateral nature of the US space resources legislation of 2015. They also said that the economics of space resource activities need to be considered and the ‘first come first served’ model needs to be avoided.¹⁰⁸⁷ Belgium also expressed concern about the potential for space resources to bring about diverging interpretations of the space law treaties. Therefore, there needs to be an multilateral international framework for space resources. Belgium considers the Moon Agreement a good basis for such a framework but would not be opposed to a new treaty if it were to garner wider acceptance than the Moon Agreement. Belgium also stated that they consider UNCOPUOS to be the competent body for addressing this topic and wants it to be kept on the agenda of the Legal Subcommittee. Belgium also stated that there is a need to avoid the historical pattern of terrestrial resource conflicts

¹⁰⁸⁵A/AC.105/1113 (n 76), para 74-86

¹⁰⁸⁶UNCOPUOS, ‘Annotated Provisional Agenda’ (27 January 2017) UN DOC A/AC.105/C.2/L.299

¹⁰⁸⁷Belgian Delegation – UNCOPUOS Legal Subcommittee – 27 March 2017 1015-1019

from spreading into outer space and that this should be part of the objective of the multilateral framework.¹⁰⁸⁸

The Russians also repeated their concerns from the previous year. They also called for the Legal Subcommittee to protect its place as the central forum for space law. They also expressed concern about ‘spill over’ of space law to other UN bodies, stipulating that space law should remain focused on UNCOPUOS. Russia also warned against letting ‘unilateral’ interests taking dominance in space law, warning that to do so would invite chaos. Furthermore, they expressed concern about allowing commercial ‘specific interests’ to garner too much attention. They also criticized all states considering space resource activities laws expressing concern over allowing a ‘flags of convenience’ situation to develop. They also expressed concern about diluting the space law regime, going on to say that the ‘unilateral’ approach is unacceptable the prerogative for new space law rests with UNCOPUOS as only UNCOPUOS can take into consideration international concerns.¹⁰⁸⁹ Russia also complained about the lack of discussion about the phrases ‘province of all mankind’ and ‘Common Heritage of Mankind’ although they also stipulated that UNCOPUOS needs to avoid getting overly concerned with theory saying that UNCOPUOS should instead focus on practical issues like space debris mitigation.¹⁰⁹⁰ However, they also stated that there needs to be greater clarity regarding interpretation of the Outer Space Treaty in order to avoid a clash of differing interpretations, divergent regime and event conflict. They further stated that a space resources regime should be tailored to outer space and not a copy of a terrestrial regime.¹⁰⁹¹

¹⁰⁸⁸Belgian Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 1421-1429

¹⁰⁸⁹Russian Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 831- 842

¹⁰⁹⁰Russian Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 950-958

¹⁰⁹¹Russian Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 919-922

The Chinese delegation said that space resource activities raise many questions, especially in the commercial context. They stipulated that there is a need to protect the freedom of all countries to access and use space and that the interests of all of humanity need to be taking into consideration especially the interests of developing countries. China accepts that the freedom of use and exploration of space includes space resource activities which extends to private entities, but this use and exploration must be in line with the space law treaties. They also stipulated that too exclusive an approach to space resource activities would be a violation of Article II of the Outer Space Treaty. The Chinese delegation stated that while there is a duty of sharing the benefits of space activities and space resources, equitable does not mean equal and there is a need to balance international and national interests as well as bear in mind the needs of developing countries and intergenerational equity. Further, they stipulated that protecting the space environment also needs to be considered stating that ignoring and destroying the space environment is an abuse of rights and violates space law. China stated that a widely supported multilateral mechanism is needed which takes the Outer Space Treaty as its foundation.¹⁰⁹²

The German delegation stated that the unilateral approach to space resource activity regulation needs to be avoided and that there needs to be a multilateral international space resources regime in order to avoid conflict. This regime would bring certainty which would be of benefit to industry and investors. The Germany delegation stipulated that they think the ITU regime is a good model to follow for regulation of space resource activities. Germany stated that in their view Article II of the Outer Space Treaty limits the freedom of use and exploration which also needs to be for the benefit and in the interests of everyone which is one of the reasons an multilateral

¹⁰⁹²Chinese Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 932-946

regime is needed in order to ensure that. Further, Germany stipulated that space resource activities go beyond the traditional understanding of ‘use’ and ‘exploration’ and therefore is not covered under Article I of the Outer Space Treaty. Germany further states that States can only licence space resource extraction if those States have ownership over those resources, which of course would be a violation of Article II of the Outer Space Treaty.¹⁰⁹³

Brazil expressed concern over the trend for unilateral approaches to regulating space resource activities. They said that this would lead to diverging interpretations of space law which could lead to conflict. Brazil says that they see the view that the space treaties do not authorise space mining as being the stronger view. They also said that while they are able to see the possible benefits of space resources and they do not wish to stop it they also cannot dismiss the legal issues. Brazil also stated that the UNCOPUOS Legal Subcommittee needs to act now in order to mitigate the risk of conflict.¹⁰⁹⁴ Responding to other States who had said that UNCOPUOS does not have a mandate for treaty interpretation, Brazil said that that was too narrow a view of the UNCOPUOS mandate. Brazil argued UNCOPUOS is the place to discuss space law and that if UNCOPUOS does not provide answers someone else will.¹⁰⁹⁵

France also expressed support for a multilateral approach to space resource activities rooted in UNCOPUOS. They also stated that discussion needs to happen before space resource activities are initiated and expressed support for the work of The Hague International Space Resources Governance Working Group articulating the view that it could serve as the basis for the future work of UNCOPUOS.¹⁰⁹⁶

¹⁰⁹³German Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 823-906

¹⁰⁹⁴Brazilian Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 1405-1410

¹⁰⁹⁵Brazilian Delegation – UNCOPUOS Legal Subcommittee – 29 March 1501-1505

¹⁰⁹⁶French Delegation – 28 March 2017 1429-1432

Luxembourg took the opportunity to discuss their draft space resources legislation which was at the time under consideration by their parliament. Luxembourg stipulated that they will monitor the sustainability of their space resource activities and their environmental impact. They also reassured UNCOPUOS that their activities are purely peaceful and there is no intent to appropriate. All space resource activities will be duly authorised and supervised by Luxembourg and respect Earth and outer space. Luxembourg also said that it is the role of States to encourage development and provide a regulatory framework for new space activities such as space resources. They also said that cooperation in the field of space resource activities is essential.¹⁰⁹⁷

The United States reaffirmed the consistency of US regulation of private actors in outer space with its international obligations and stipulated that it will continue to be guided by the four ‘core’ space law treaties.¹⁰⁹⁸ The US made a point of stipulating that neither the ‘Common Heritage of Mankind’ principle nor the phrase ‘global commons’ can be found in the Outer Space Treaty. The US questioned the relevance of the Moon Agreement to discussions of space resources given that treaty’s low number of ratifications. The US also pointed out that space resources activities have not yet happened and that the US space resources law is subject to the US’ international obligations and any activity authorised by the United States will be conducted in accordance with international law including the Outer Space Treaty. Further, the US stated that the drafters of the Outer Space Treaty could have prohibited space resource activities but did not do so. The US declared that it is firm in its assessment that Article I of the Outer Space Treaty allows extraction of resources and that Article II does not constitute a prohibition. The US also said that the solution to

¹⁰⁹⁷Luxembourg Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 1416-1420

¹⁰⁹⁸US Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 855-903

concerns over interests of all humanity not being taken into consideration by the space resources industry is not to kill off the industry but to join it.¹⁰⁹⁹ The US also reiterated that they do not view their activities as ‘unilateral’ or incompatible with international law, arguing that the international community has already taken action in the form of the Outer Space Treaty which provides a legal regime for space resource activities.¹¹⁰⁰ The US supported the continuation of space resources as an agenda item but did not think a working group was appropriate at that time. The US also stated that the UNCOPUOS Legal Subcommittee does not have a mandate to discuss treaty term definitions which is for States Parties either individually or in a conference of the parties to the treaty.¹¹⁰¹

Several other countries also made interjections into the debate which. The Iranians stated that they view outer space and the celestial bodies as part of the Common Heritage of Mankind.¹¹⁰² Sudan said that outer space is universal natural heritage and belongs to everyone. They also argued that developing states should be able to profit from space even if they are not able to launch into space themselves.¹¹⁰³ Morocco expressed the view that national legislation is insufficient to regulate space resource activities. They also said that an international regime would be better able to address the issues and concerns of developing states.¹¹⁰⁴ Chile said that the five UN space law treaties need to be ‘updated’ so as to be able to address the topic of space resources.¹¹⁰⁵ Cuba said that use of space resources must not exacerbate global inequality.¹¹⁰⁶

¹⁰⁹⁹US Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 1433-1441

¹¹⁰⁰US Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 923-925

¹¹⁰¹US Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 1437-1457

¹¹⁰²Iran Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 848-849

¹¹⁰³Sudan Delegation – UNCOPUOS Legal Subcommittee – 28 March 2017 1347-1350

¹¹⁰⁴Morocco Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 1420-142

¹¹⁰⁵Chile Delegation – UNCOPUOS Legal Subcommittee – 29 March 2017 1445-1446

¹¹⁰⁶Cuba Delegation – UNCOPUOS Legal Subcommittee – 31 March 2017 837-838

Discussions on space resource activities at the UNCOPUOS Legal Subcommittee in 2018 continued with greater participation. In 2018 space resources appeared under agenda item 15 ‘general exchange of views on potential legal models for activities in exploration, exploitation and utilization of space resources.’¹¹⁰⁷

The Russian delegation continued in much the same vein as in previous years. They said that while the work of The Hague Space Resources Governance Working Group is interesting it should not prejudice the work of UNCOPUOS. The Russians stated that it is for the Legal Subcommittee to consider legal models for important issues like space resources not outside entities. The Russian delegation also stated that it is unacceptable for matters which fall under the purview of the Legal Subcommittee to be put up for discussion at ‘side events. Further, the Russian delegation questioned the motives of those ‘avoiding’ the creation of new legally binding space law instruments and called for all states to stick to using UNCOPUOS as the main forum for international space law discussions and to remain within the framework of the United Nations.¹¹⁰⁸

Luxembourg said that it makes sense for them to work within the existing international framework as it is accepted and respected by the vast majority of states.¹¹⁰⁹ Their space resources law came into force the previous August and they viewed this as being necessary in order to fulfil their obligations under Article VI of the Outer Space Treaty. They also articulated the view that cooperation is essential for space resource activities and to that end Luxembourg has entered and is seeking to enter into more bilateral arrangements.¹¹¹⁰

¹¹⁰⁷UNCOPUOS ‘Annotated Provisional Agenda’ (29 January 2018) UN DOC A/AC.105/C.2/L.303

¹¹⁰⁸Russian Delegation – UNCOPUOS Legal Subcommittee – 10 April 2018 842-847

¹¹⁰⁹Luxembourg – UNCOPUOS Legal Subcommittee – 10 April 2018 1343-1344

¹¹¹⁰Luxembourg – UNCOPUOS Legal Subcommittee – 13 April 2018 906-912

The United States also said that it was within the clear national interest of the United States to work within the framework of the Outer Space Treaty and the 3 other ‘core’ space law treaties. The US said that it will continue to abide by and be guided by the ‘four core’ space law treaties and that it is under those treaties and the legal regime created by them that the use of space and space commerce has grown and flourished.¹¹¹¹ The US also, again, points out that no actual space resource activities have happened yet. They also reaffirmed their view that space resource activities are fully consistent with the space law treaties. The US said that there is considerable confusion about the topic of space resources which is clear in the writing of several States. They also expressed confusion by the positions of some of the parties to the Moon Agreement and questioned how much the opposition to the US space resources law is based on political motives.¹¹¹²

Two groupings of developing states made statements, first the Group of Latin American Countries (GRULAC) made a statement via the delegation of Argentina. GRULAC expressed the view that it is vital that any space resources governance regime uphold the space law treaties. They also said that the freedom to exploit space resources is not an absolute freedom but one which is tempered by the provisions of the space treaties such as the obligation to carry out activities for peaceful purposes and in the interests and for the benefits of all countries. They also stated that UNCOPUOS needs to undertake a good faith review of the space law treaties and development models for the legal regulation of space resource activities.¹¹¹³ Nigeria then spoke on behalf of the Group of 77 and China and said that the Group was of the view that an international framework for space resource activities is necessary and

¹¹¹¹United States – UNCOPUOS Legal Subcommittee – 10 April 2018 1328-1329

¹¹¹²United States – UNCOPUOS Legal Subcommittee – 13 April 2018 1336-1337

¹¹¹³GRULAC – UNCOPUOS Legal Subcommittee – 13 April 2018 835-840

could play an important role. They also said that there is a need for a broad debate which includes developing countries and considers their needs and rights. This discussion is urgent given that countries have implemented and are developing national legislation.¹¹¹⁴

Germany said that the international space law regime needs to be developed in order to facilitate space resource activities. They said that an international framework is important, and it needs to balance the needs and interests of all countries as well as the needs and interests of investors and operators. They also said that unilateral approaches are likely to give rise to uncertainty and that space resource governance and regulation needs to be conducted at the international level. They also said that there needs to be discussion and understanding of the common thinking on space resources such as what the definition of ‘exploitation’ of space resources means and the differences between commercial missions and scientific activities. They also said that there is a need to discuss the boundary between the freedom of use and exploration and the prohibition of national appropriation. Further they said that UNCOPUOS should consider Article 11 of the Moon Agreement or something similar as a basis for an international framework. Though they also suggested that something like the ITU frequency management regime might work.¹¹¹⁵

Austria said that while the Outer Space Treaty provides a basic framework further developments and discussion are needed.¹¹¹⁶ Austria said that given that national legislation on space resources now exist it is therefore pertinent that UNCOPUOS discuss an international legal framework on space resource activities. They also said that it still needs to be discussed whether non-renewable space resources can be

¹¹¹⁴Group of 77 and China – UNCOPUOS Legal Subcommittee – 13 April 2018 841-842

¹¹¹⁵Germany – UNCOPUOS Legal Subcommittee – 13 April 2018 853-854 GMT

¹¹¹⁶Austria – UNCOPUOS Legal Subcommittee – 9 April 2018 907-908

subjected to ownership given Article II of the Outer Space Treaty. Austria suggested the legal regime of the deep seabed as a model to follow. They said that space resource activities need to be coordinated at an international level in order to avoid conflict. Arguing that the best way to do this is via Article 11 of the Moon Agreement but even those States which are not party to the Moon Agreement should adopted a multilateral approach to space resource activity regulation.¹¹¹⁷

Belgium stated that they recognize that space resource activities are no longer a theoretical issue but a real issue that will have long term ramifications and therefore it is vital that this issue is addressed by UNCOPUOS. Belgium also notes the work of several non-governmental bodies on space resources but stated that they take issue with work being done outside of UNCOPUOS and that those groups do not include all the member states of UNCOUPOS.¹¹¹⁸ This prompted a response from The Netherlands. The delegation from The Netherlands stated that the work of The Hague International Space Resources Governance Working Group is perfectly legitimate and that the Working Group has no intention of interpreting the space law treaties, which is the purview of the parties to the treaty. The Netherlands warned that a limited number of states engaging in an activity can and has given rise to customary international law, so it would therefore be prudent for UNCOPUOS to work on developing an international framework on space resource activities before that happens. Furthermore, they stated that there is no intention of the Draft Building Blocks being developed by the Working Group becoming binding or creating customary international law they are intended as a starting point for discussion by states.¹¹¹⁹

¹¹¹⁷Austria – UNCOPUOS Legal Subcommittee – 13 April 2018 858-903

¹¹¹⁸Belgium – UNCOPUOS Legal Subcommittee – 13 April 2018 915-916

¹¹¹⁹The Netherlands – UNCOPUOS Legal Subcommittee – 13 April 2018 927-928

The United Arab Emirates said that both a top down international approach and a national ‘bottom up’ approach is necessary. However, there needs to be a recognition that these will move at different speeds. They also said that the long-term sustainability of space activities requires a responsive international framework. To that end it is important for there to be a way for states to share details of their space resource activities.¹¹²⁰

Mexico said that recognizing that they would not be able to prevent space resource activities from occurring it makes sense and is necessary to consider an international legal framework. This should be undertaken by UNCOPUOS however they said that every country has a right to develop national laws regarding any treaty to which they are a party.¹¹²¹

China said that multilateralism should be upheld with regards to any international space resource activities legal regime and that there needs to be a mechanism to ensure the benefits and interests of all countries and people are given their due consideration. Further there should be an intergovernmental process for such discussion and that UNCOPOUS is the place for that discussion. China also stipulated that there needs to be an international legal framework in order to ensure that space resource activities are carried out in conformity with international law.¹¹²²

At the 2019 session of UNCOPUOS Legal Subcommittee the Group of Latin American Countries (GRULAC) was the first to address the space resources topic. The statement was made by the delegation from Costa Rica who said that Article I OST freedoms are not absolute but are restricted by the second paragraph of Article I OST. GRULAC expressed concern about the generality of the existing national legislation

¹¹²⁰UAE – UNCOPUOS Legal Subcommittee – 13 April 2018 921-922

¹¹²¹Mexico – UNCOPUOS Legal Subcommittee – 13 April 2018 932-938

¹¹²²China – UNCOPUOS Legal Subcommittee – 13 April 2018 1340-1347

on space resources. They said that UNCOPUOS needs to take action which could include drafting model clauses for use in national legislation.¹¹²³

Germany said that commercial space resource extraction requires an international regime in order to comply with the space treaties especially Article II of the Outer Space Treaty. They also said that developing a regime as envisioned by Article 11 of the Moon Agreement is the best route for ensuring conformity with the space treaties and providing stability and security which will allow the space resources industry to flourish. They also pointed out that it is not required to be a party to the Moon Agreement in order to be part of such a regime.¹¹²⁴

One of the key points of discussion in the 2019 session was the working paper introduced by Greece and Belgium on the creation of a Working Group within the Legal Subcommittee of UNCOPUOS on space resources.¹¹²⁵ Belgium argued that while the ‘general exchange of views’ on space resources in the 2019 and previous Legal Subcommittee sessions had been a useful process they expressed the view that the Legal Subcommittee needs to try to move forward. They argued that establishing a working group on space resources is one potential way to do that. Belgium also said that it was never their view that the UN or UNCOPUOS has to be the exclusive forum for discussion of space resources, they recognize that the inclusion of academia and private actors is important but stressed that the interpretation of treaties is only for States and therefore treaty interpretation should only be conducted at forums like UNCOPUOS.¹¹²⁶

¹¹²³GRULAC – UNCOPUOS Legal Subcommittee – 5 April 2019 827-828 GMT

¹¹²⁴Germany – UNCOPUOS Legal Subcommittee – 5 April 2019 829-833 GMT

¹¹²⁵UNCOPUOS ‘Proposal for Working Methods and Work Plan of the Working Group on Legal Aspects of the Exploration, the Utilization and the Exploitation of Space Resources, (with Reference to Document A/AC.105/C.2/L.311’ UN Doc A/AC.105/C.2/2019/CRP.26

¹¹²⁶Belgium – UNCOPUOS Legal Subcommittee – 5 April 2019 908-911 GMT

The Greek delegation framed the need for an international framework on space resources as being necessary for the success of industry as it would provide the ‘legal certainty’ that would enable the space resources industry to source the intensive capital investments that will be necessary. The Greek delegation also voiced concern over the danger of divergent regulatory regimes (i.e. between those who are party to the Moon Agreement and those who are just party to the Outer Space Treaty.) They said that any UNCOPUOS working group on space resources needs to address this issue.¹¹²⁷

In relation to the Greek and Belgian working paper The Netherlands said that it is premature to identify an ‘exclusive’ forum for discussion space resources regulation. They also took the opportunity to state that the best mandate for a space resource governance framework comes from Article 11 of the Moon Agreement not Article I of the Outer Space Treaty. The Netherlands further stated that they believe that regulation and cooperation is essential for space resource activities but that they also believe that such regulation needs to be inclusive and involve industry and civil society.¹¹²⁸

China said that discussions on space resources should take place within the UN system specifically UNCOPUOS. They also supported setting up a dedicated working group within the Legal Subcommittee and expressed support for the Greek and Belgian working paper describing it as ‘well-balanced’. China also said that an international regime needs to consider benefits sharing and long term sustainability. It also needs to be a multilateral process which ensures that space resources benefit all countries with particular regard given to the needs and interests of developing countries. China stated

¹¹²⁷Greece – UNCOPUOS Legal Subcommittee – 5 April 2019 846-850

¹¹²⁸The Netherlands – UNCOPUOS Legal Subcommittee – 5 April 2019 839-840

that the Legal Subcommittee needs to be proactive in order to ensure the orderly and sustainable use of space resources.¹¹²⁹

The French delegation said that France is deeply committed to an international, multilateral approach to space resource activity governance and that there is more at stake than the interests of private sector actors or individual States. They also stated that they are not calling into question the legitimacy of any of the existing national legislation. They also raised the issues of access and the outer space environment, saying that there is a need to strike a balance between all actors concerned.¹¹³⁰

The Russian delegation continued in the same vein as most previous years. They said that if States are going to keep referencing the work of The Hague International Space Resources Governance Working Group then UNCOPUOS needs to be better informed of the work stating that references to national statements are not sufficient. However, they also said that they agreed with Belgium that no group, no matter how distinguished, has the capacity to interpret treaties in the place of UNCOPUOS. Russia also declared that UNCOPUOS may need to take a fresh view of the Moon Agreement and perhaps go so far as to call on States to accede to the Moon Agreement.¹¹³¹ On the question of a working group Russia stated that such a group would need to consider drafting a binding legal instrument creating a specific framework for the regulation of space resources. They further stated that they feel there are still many questions to answer and a working group would need a sufficiently broad mandate in order to be able to address those questions.¹¹³²

Luxembourg stated that it is taking a phased approach to the development of a national framework. They are also discussing and working on developing an international

¹¹²⁹China – UNCOPUOS Legal Subcommittee – 5 April 2019 853-856

¹¹³⁰France – UNCOPUOS Legal Subcommittee – 5 April 2019 902-903

¹¹³¹Russia – UNCOPUOS Legal Subcommittee – 5 April 2019 917-920

¹¹³²Russia – UNCOPUOS Legal Subcommittee – 8 April 2019 923-924

framework in multiple forums. Luxembourg said that they recognize the value of an international legal framework which would provide a solid bedrock for the space resources industry and help to provide legal certainty. Luxembourg said that they recognize the dangers of divergent regimes, saying that such an outcome is not in the interests of the space resources industry as it would undermine legal certainty. They also said that it is not in the interests of the international community which is why Luxembourg is promoting the development of an international framework.¹¹³³

Australia expressed the view that a non-binding framework should be considered. Australia stated that the Outer Space Treaty does not create any obligation to adopt a binding framework. They also stated that the 18 Moon Agreement States need to consider their obligations under the Moon Agreement. Australia said that it has not considered its obligations under the Moon Agreement but noted that this is for those states which are party to the Moon Agreement to do when it is deemed necessary.¹¹³⁴

Japan stated their view that it is important that all stakeholders cooperate with each other in order to ensure that activities develop in accordance with international law and in an appropriate manner.¹¹³⁵ Colombia said that there needs to be a clearer definition of exploitation and exploration, saying that commercial exploitation goes above and beyond exploration and use. Colombia also said that UNCOPUOS is the place to discuss space resources as it allows the broadest range of States to participate. Colombia also expressed concern that space resources are only accessible by a small number of states and that to adopt a ‘first come, first served’ approach would undermine the spirit of the Outer Space Treaty.¹¹³⁶ The Egyptian delegation said that there needs to be a decision as to whether the resources of the Moon are different from

¹¹³³Luxembourg – UNCOPUOS Legal Subcommittee – 5 April 2019 1347-1351

¹¹³⁴Australia – UNCOPUOS Legal Subcommittee – 5 April 2019 913-914

¹¹³⁵Japan – UNCOPUOS Legal Subcommittee – 5 April 2019 1342-1343

¹¹³⁶Colombia – UNCOPUOS Legal Subcommittee – 5 April 2019 1344-1345

resources found elsewhere in outer space and whether they need to be regulated as such.¹¹³⁷

Austria said that it still needs to be discussed whether non-renewable resources in space can be subject to private appropriation but also said that UNCOPUOS could look at the Law of the Sea as a possible way forward. Austria also said that while it may be some time before activities happen or at least before they become profitable as there is already national legislation it is imperative that the international community discuss the issue now. Austria also said that even if there is agreement that space resources can be appropriated there are still many questions to answer about how such activities can be carried out in line with the principles set out in the space treaties. Austria also said that a multilateral approach is necessary as activities need to be coordinated at the international level in order to ensure safety, sustainability, and equity. Once again Austria says, as a party to the Moon Agreement, that it views the Moon Agreement as the best way forward and encourages other States to sign up to the Moon Agreement.¹¹³⁸

The United States said that UNCOPUOS needs to tread carefully with regards to developing new binding space law so as to not unduly burden new and emerging industries.¹¹³⁹ The US reaffirmed their view that space resource activities are in line with the ‘four core’ UN treaties. The US also stipulated that they do not see a need for an international regime at this stage. The US stated that UNCOPUOS needs to keep in mind the reality that the space resources industry is still in a very early stage of development and no activities have, as yet, occurred. The US said that any space resources working group should be time limited and given a clear mandate. However,

¹¹³⁷Egypt – UNCOPUOS Legal Subcommittee – 5 April 2019

¹¹³⁸Austria – UNCOPUOS Legal Subcommittee – 8 April 2019 843-846

¹¹³⁹US – UNCOPUOS Legal Subcommittee – 5 April 2019 1328-1329

they stressed that the US is of the view that the existing legal framework is sufficient to regulate existing and currently proposed space activities and cautioned against moving too fast.¹¹⁴⁰

9.6 The Hague International Space Resources Governance Working Group

The Hague Space Resources Governance Working Group is an independent international forum comprised of academics, governments and other stakeholders. They have produced a set of building blocks for the development of an international framework on space resource activities.¹¹⁴¹ The purpose of these building blocks is to “lay the ground work for international discussions on the potential development of an international framework...”¹¹⁴² As an early group with a broad international makeup it is worth considering the provisions of the ‘Building Blocks’. This will be discussed below.

The definition of space resource is seemingly now agreed upon. The US Title IV, the Luxembourg Space Resources law and the Hague Building Blocks all use some variation of “an extractable abiotic resource *in situ* in outer space.”¹¹⁴³ This is a new definition for space law as it does not appear in any of the five space treaties, not even the Moon Agreement. However, it is similar to the definition of ‘resources’ found in UNCLOS¹¹⁴⁴ and this definition brooked little opposition at the several sessions of UNCOPUOS Legal Subcommittee since the enactment of the US Title IV.¹¹⁴⁵

¹¹⁴⁰US – UNCOPUOS Legal Subcommittee – 8 April 2019 858-859

¹¹⁴¹The Hague Working Group Building Blocks (n 61)

¹¹⁴²*Ibid*, preamble

¹¹⁴³CSLCA (n 48), Title IV, §51301; Explanatory Statement (n 1052), 1; The Hague Working Group Building Blocks (n 61), Building Block 2.1

¹¹⁴⁴UNCLOS (n 57), 133(a); Tanaka *The International Law of the Sea* (n 57), 180

¹¹⁴⁵UNCOPUOS, ‘Report of the Legal Subcommittee on its Fifty-eight Session, held in Vienna from 1 to 12 April 2019’ (18 April 2019) UN Doc A/AC.105/1203 paras 239-267; A/AC.105/1177 (n 76), paras 229-265; A/AC.105/1122 (n 76), paras 34, 50 and 221-250; A/AC.105/1113 (n 76) paras 74-83

However, it would be premature to discuss customary international law status as there is no indication of *opinio juris* at least at this stage.

The Hague International Space Resources Governance Working Group Draft Building Blocks also define ‘Utilization of Space Resources’.¹¹⁴⁶ The Outer Space Treaty uses use not utilization¹¹⁴⁷, the Moon Agreement uses use or exploitation¹¹⁴⁸, the US Title IV uses ‘commercial recovery’¹¹⁴⁹ and the Luxembourg law uses the phrase ‘exploration and use’. The Hague Working Group defines utilization of space resources as “the recovery of space resources and the extraction of raw materials or volatile materials therefrom.” This is therefore the process of mining and refining raw materials.

The Hague Working Group also uses the broader term of ‘space resource activity’ which includes the exploration phase of mining operations and also encompasses the construction phase for any necessary equipment to conduct utilization of space resources.¹¹⁵⁰ The Building Blocks use the standard definition for space object¹¹⁵¹ but introduce a new term ‘space-made product’ which is defined as a “product made in outer space wholly or partially from space resources.”¹¹⁵² And ‘operator’ which is defined as “a governmental, intergovernmental or non-governmental entity conducting space resource activities.”¹¹⁵³

The Building Blocks, having introduced the new term of ‘space-made product’ recognize that there needs to be international responsibility for these objects and essentially proposes extending the ‘space object’ regime to ‘space-made products’

¹¹⁴⁶The Hague Working Group Building Blocks (n 61), Building Block 2.2

¹¹⁴⁷OST (n 1), Article I

¹¹⁴⁸Moon Agreement (n 2), Article 2, Article 11 (5)

¹¹⁴⁹CSLCA (n 48), Title IV, §51302(a), §51303

¹¹⁵⁰The Hague Working Group Building Blocks (n 61), Building Block 2.3

¹¹⁵¹*Ibid*, Building Block 2.4

¹¹⁵²*Ibid*, Building Block 2.5

¹¹⁵³*Ibid*, Building Block 2.6

while maintaining a distinction between those objects *launched* into outer space and those made from space resources.¹¹⁵⁴

The Building Blocks also call for the attribution of ‘priority rights’ which are limited in duration and area of application but internationally recognized so as to allow an operator the ability to search and/or recover space resources without undue interference.¹¹⁵⁵ The Building blocks also stipulate that the international framework

should ensure that resources rights over raw mineral and volatile materials extracted from space resources, as well as products derived therefrom, can lawfully be acquired through domestic legislation, bilateral agreements and/or multilateral agreements.¹¹⁵⁶

Interestingly the Building Blocks do not provide a definition of resource rights. The term seems to be mainly used by Non-governmental organizations focusing on indigenous rights and/or sustainable development. The World Resources Institute stipulate that resource rights are about helping rural people in developing countries secure the benefits of their land and natural resources in the face of insecure property rights.¹¹⁵⁷ Global Forest Watch stipulate that the phrase ‘resource rights’

refers to areas over which indigenous peoples or local communities enjoy rights to certain resources and a limited right to access the land, whether legally recognized or not, in order to exercise their resource rights. The exact nature of these resource rights varies among tenure type and country.¹¹⁵⁸

Similarly, the Center for International Environmental Law regards resource rights as being part of the efforts to securing ‘communities’ rights to their land and resources in the face of insecure property rights and attempts by governments and private actors

¹¹⁵⁴*Ibid*, Building Block 6

¹¹⁵⁵*Ibid*, Building Blocks 7 and 14(a)

¹¹⁵⁶*Ibid*, Building Block 8.1

¹¹⁵⁷World Resources Institute ‘Land and Resource Rights’ <<https://www.wri.org/our-work/project/land-and-resource-rights>>

¹¹⁵⁸Global Forest Watch ‘Resource Rights’ <https://data.globalforestwatch.org/datasets/165e621a0b4245f2b10df4ed8aabbf271_0>

to acquire their land.¹¹⁵⁹ Trócaire also place ‘social and economic justice’ at the centre of their definition of ‘resource rights’.¹¹⁶⁰ However, it is reasonably clear from the way that the term is used in the Hague Working Groups draft Building Blocks that this was not what was intended by the use of this phrase. The use of the phrase in the Building Blocks more closely aligns with the term ‘mineral rights’¹¹⁶¹ Although again the term as used in the building blocks does not exactly align with the general use of the term which is generally about the right to extract resources (and so in the formulation of the Building Blocks would be ‘priority rights’).¹¹⁶² The term as used in the Building Blocks seems to be an attempt to grant ‘property rights’ over extracted resources without using the phrase ‘property rights’ which does not appear anywhere in the building blocks. The aversion to using the phrase ‘property rights’ is understandable given the issues that could arise.

The Building Blocks also provide for a ‘claims register’ for the registration of priority rights¹¹⁶³ as well as an international database for providing notifications of space resource activities.¹¹⁶⁴ The Building Blocks also call for the development of Area-based safety measures although recognizing the limitations of Article II of the Outer Space Treaty stipulates that “such safety measures shall not impede the free access... to any area...”¹¹⁶⁵ Highlighting the necessity of international cooperation and coordination of space activities, whether they are engaged in the ‘use’ of space resources or not.

¹¹⁵⁹Center for International Environmental Law ‘Land and Resource Rights’ <<https://www.ciel.org/issue/land-resource-rights/>>

¹¹⁶⁰Trócaire *Natural Resource Rights Framework: A Practical Guide for Programme Design* (2014) <https://www.climatelearningplatform.org/sites/default/files/resources/national-resource-rights-framework.pdf>

¹¹⁶¹‘Mineral Rights’ Wikipedia <https://en.wikipedia.org/wiki/Mineral_rights>

¹¹⁶²Timothy Fitzgerald ‘Understanding Mineral Rights’ (Montana State University 2017) <<http://msuextension.org/publications/AgandNaturalResources/MT201207AG.pdf>>

¹¹⁶³The Hague Working Group Building Blocks (n 61), Building Blocks 14(a), 18(a)

¹¹⁶⁴*Ibid*, Building Block 18(b)(i)

¹¹⁶⁵*Ibid*, Building Blocks 11.3, 14(b), 18(b)(i)

Indeed this is a key and common point of the building blocks that there is the need for there to be international or at least mutual recognition of the mineral/access/priority/property rights of operators as well as cooperation and coordination of efforts to regulate the associated activities. This is indeed key, especially as space resource activities are likely to be international ventures, but also given the potential for operators from multiple potentially ‘less than friendly’ states proactive steps need to be taken in order to safeguard the peaceful nature of space, something which all States party to the Outer Space Treaty have an obligation to ensure not just of their own actions but also the actions of their nationals in outer space. However, there does need to be caution as mineral/access/priority/property rights can quite easily turn into ‘national appropriation by means of use, occupation or any other means.’

9.7 Conclusion

The role of this chapter has been to discuss the ongoing developments relating to space resources. It examined the legal and policy frameworks in the United States and Luxembourg, as well as the ongoing discussions at the UN and The Hague International Space Resources Governance Working Group. This is important, international law is not static. The actions and views of states push the development of international law, and as this chapter demonstrates, the views of states on the legal issues around space resources are development.

The first section of this chapter examined the relationship between international and national law. This provides an important context. The next section examined US law and policy on space resources. From the first attempt to produce national legislation known as the ASTEROIDS Act, to the ultimately successful law of 2015 then ahead to legislation under consideration by Congress as a way of examining potential future

developments. Then the section looks at Space Force and the Trump administrations space policy. This is relevant not only because it highlights the potential future direction for US space law and policy but also because Space Force highlights one of the potential dangers for the future of space resources, that it could prove to be a source of conflict or at least instability. This enhances the case for an international approach to space resource governance. Finally, the section looks at how international law interacts with the US legal system, this is important because it is likely to be US Courts who determine how exactly to interpret the interaction of the 2015 law and Article II of the Outer Space Treaty.

The next section examines the Luxembourg law on space resources. Luxembourg's law is more comprehensive and was published with an explanatory document, so their intentions are clearer. It also looked at how international law works in Luxembourg, which is quite a different situation from the United States and more in line with The Netherlands.

Then an in-depth examination of the debates that have happened at UNCOPUOS since the enactment of the US law in 2015. It is important that this is undertaken, particularly in this level of detail to demonstrate the development of international opinion over these recent years. This is, in essence, the evidence for the claim in this work that the status of space resources in international law has, or at least is, changing.

Finally, this section looks at the work of The Hague Space Resources Governance Working Group an independent international forum comprised of academics, governments and other stakeholders. They have produced a set of Building Blocks for the Development of an International Framework on Space Resource Activities. This process has been influential in driving discussion at UNCOPOUS and is likely to continue to influence it for some time to come.

The next chapter, the conclusion of this work will provide a final summary of the work and it will provide answers for the research questions, a proposed solution, and identify scope for further work.

Chapter Ten: Conclusion

10.1 Overview

The purpose of this study has been to critically evaluate the governance framework of outer space in order to establish whether space resource activities are permitted and, if they are, what will the legal regime look like. The driver of this is the ambiguity in Articles I and II of the Outer Space Treaty. States are free to ‘use’ outer space but not to ‘appropriate’ it. This study has clarified what these provisions mean and how they apply to the question of space resources activities. Demonstrating that they are permitted by international space law albeit not without restriction. Further, international cooperation is necessary in order to properly govern space resource activities and ensure the certainty that industry requires in order to generate the necessary investment.

This is the biggest potential impact of this study; it underscores the practical need for an international framework on space resources. The international community is currently in the process of debating this through UNCOPUOS and this study could influence minds, particularly as The Hague Space Resources Governance Working Group has proposed just such a framework. Indeed, as this author has been a member of that Working Group the work undertaken in service of this study has already had an impact on the debate, though there is still more to do.

An additional potential impact of this study is regarding the question of defining ‘celestial bodies.’ There have been, and are, proposals to create ‘categories’ of celestial bodies and potentially even exclude certain size bodies from the ‘non-appropriation principle’ altogether, this work takes an in-depth look at the definition of celestial bodies as used in the Outer Space Treaty, and should warn against such notions. The

Outer Space Treaty does not contain a definition of this term, which has not received as much attention as the definition of ‘outer space.’ Indeed, beyond this work, only Fasan¹¹⁶⁶ and Pop¹¹⁶⁷ have examined the term in any great detail.

This work began in chapter two with an overview of space resource activities and some of the proposals that have been put forward. As was shown, space resource activities are economically and technically feasible. Furthermore, States are taking this prospect seriously and have introduced legislation to regulate it. Therefore, space resource activities and the legal issues presented by it need to be taken seriously. Furthermore, it is imperative that the actual, physical distribution of resources is taken into consideration when devising any property rights regime or governance framework for space resource activities. Effective resource management is key for sustainability, which is necessary because while there is a considerable quantity of material available it is not infinite. Sustainability is, or should be, a key aspect of any property rights regime.

Chapter three addressed the framework of public international law within which the space governance regime sits. It examined space law’s status as a ‘special regime’ of international law and the concept of ‘gaps’ although as argued in this work, within a positivist conception of international law it is more appropriate to talk of ‘silence’ as ‘gap’ assumes a natural completeness. Further, this chapter argued that the structure of the Outer Space Treaty leaves it open to future developments and an evolutionary approach to interpretation. Although the primary method for treaty interpretation must be the ‘plain ordinary meaning’ approach as outlined in the Vienna Convention on the Law of Treaties. The chapter also presented Customary International Law as an

¹¹⁶⁶Fasan, ‘Asteroids and other Celestial Bodies’ (n 4)

¹¹⁶⁷Pop, ‘A Celestial Body is a Celestial Body is a Celestial Body...’ (n 5)

important piece of the puzzle which provides a process for the evolution of international law. The case was made that soft law provides a potentially useful avenue to creating a coordinating international framework which while not as robust as a ‘hard law’ approach would provide flexibility which given the embryotic nature of space resource activities is desirable.

Chapter four examined the body of space law with a particular focus on the Outer Space Treaty as the core, foundational treaty of space law. The key objective of this chapter was to examine the definition of ‘use’ in Article I OST. This chapter makes the argument that, as indicated by the preamble, part of the ‘object and purpose of the Outer Space Treaty is to facilitate the use and development of outer space. This when combined with a ‘plain ordinary’ reading of ‘use’ in Article I OST supports a broad interpretation of the ‘term’ use, which would fit space resource activities within it. This is further supported by the *travaux préparatoires* as argued in this chapter. Therefore this chapter argues that space resource activities fall within the scope of the freedom of use as enumerated by Article I of the Outer Space Treaty, however this is subject to a few limitations such as the non-appropriation principle codified in Article II of the Outer Space Treaty.

Article II is a fundamental aspect of space law and enjoys broad support. As this chapter argues it applies to non-governmental actors by virtue of Article VI of the Outer Space Treaty, although the obligation to ensure compliance rests on the state responsible for that non-governmental actor. Regarding the meaning of ‘national appropriation’, this article makes the case that national appropriation should be interpreted to mean ‘the acquisition, in whole or in part, of outer space, the Moon and other celestial bodies, for the exclusive use of the State or its nationals. ‘This chapter also makes the argument, that the application of Article II to space resources has

developed, even if non-appropriation did apply to extracted resources there is growing acceptance, albeit not yet sufficiently crystallised to be described as a customary norm, that resources once removed from the celestial body are appropriable. This is further supported by the object and purpose of the Outer Space Treaty, which as argued above is to facilitate the use and development of outer space. Resources are needed for that. Finally, the debates during the negotiation of the Outer Space Treaty clearly indicated that the intention was Article II ensures that activities do not give rise to sovereign rights over territory not that the article should prohibit activity. Chapter four also looked at Article VI and VIII OST as mechanisms for the exercise of jurisdiction, as well as Article 11 of the Moon Agreement and the resource provisions of UNCLOS. Chapter five critically examined the definition of ‘celestial body’ a term left undefined by the Outer Space Treaty that is vital to its scope of application. The finding from examining the ‘plain ordinary meaning’ of the term ‘celestial body’ is that it is a broad term that applies to all naturally occurring bodies in the solar system regardless of their size or the ability to be moved by human intervention. Though, as it is sometimes appropriate to consider specialist or scientific definitions of terms, this chapter took a further examination of the scientific definition of the term celestial body. This was particularly useful, even in light of the ‘plain ordinary meaning’ definition as it could be possible for space law to create a new definition or even to categorize celestial bodies in a future space resources framework. However, the findings of this chapter would suggest that this would not be a prudent course of action.

Chapter six examined the history of property in the Western tradition. It examined the development of the concept from Roman law to the development under the English common law and then the property ‘revolution’ of the 17th century when the modern concept of property began to emerge as well as the further development that were

undertaken as the Western conception (specifically the Anglo-American) conception of property pushed into and beyond the frontiers of European settlement. It demonstrated that property is not a static concept but one that has developed and evolved as societal changes have pushed it. Further, it demonstrated that property is a product of the state and law and can therefore be shaped by it.

Chapter seven examined property as a legal and political concept as well as an idea and institution. Following on from this theoretical discussion of the nature of property was a discussion of the role of the state in relation to property. The chapter finished with a discussion of some alternative conceptions of property. This chapter had three key, essential arguments. It made the case that property is an evolving, complex concept which has historical and societal context. There is no one definition of 'property', it is not a static or fixed concept. Further, property is a product of society and ultimately government, even in a Lockean framework. Property is intertwined with the existence and authority of the state, it is a political creation. Finally, property is ultimately about distribution of resources, it is a mechanism for controlling access to, and use of, various resources be it gold, land or deposits of water ice on far flung asteroids.

Chapter eight examined the concepts of sovereignty and jurisdiction which underpin the international order of States. This chapter examined sovereignty in various eras and forms. It is an evolving concept, however in its current form it is dominated by the territorial variant. This is problematic for outer space as territorial sovereignty is prohibited by virtue of Article II of the Outer Space Treaty. However, there is 'personal' sovereignty or the 'nationality principle' which enables States to exercise jurisdiction over their nationals regardless of where they are. This is how States exercise control over their subjects at sea and in outer space. However, it has

limitations, most notably that it means States have jurisdiction over their nationals but do not have jurisdiction over people who are not their nationals. Further, as discussed in this chapter, jurisdiction is only as effective as the ability of the state to actually ‘control’ those under its jurisdiction. This provides further support for an ‘international’ approach to space resource governance.

Chapter nine provides an overview of the developments since 2014 in the field of space law relating to space resources. It examines the relationship between international and national law providing a necessary context. The section then examines in detail the US law and policy development since the first attempt to enact a national law on space resources in 2014. This is followed by an examination of the Luxemburg space resources law. An in depth examination of the ongoing discussions as UNCOPUOS was then undertaken, this is important particularly as a key claim of this work is that the international consensus on space resources is developing and UNCOPUOS is a primary vehicle for that development. Finally, the chapter examines the work of The Hague Space Resources Governance Working Group.

Having provided a comprehensive overview of the structure of this work, the specific research questions will now be addressed.

10.2 Research Questions

The research questions of this work focus on the core issues relating to the ‘legality’ of space resource activities. Property rights are important, they provide security and a necessary degree of certainty. Entrepreneurs and businesses want and need a favourable legal framework,¹¹⁶⁸ if for no other reason than “to be assured that the security of the return on investment afforded by ‘terrestrial property law’ will be

¹¹⁶⁸Danilenko, ‘Outer Space and the Multilateral Treaty-Making Process’ (n 53), 218

available for investments in space.”¹¹⁶⁹ However, there has been a general presumption that the non-appropriation principle articulated in Article II of the Outer Space Treaty prevents States from granting property rights to their nationals (and even from nationals ‘obtaining’ property rights without State intervention). Whether this applies to resources has been the big unanswered question, even from the existing scholarly work. The United States and Luxembourg assert that resources are appropriable once extracted from celestial bodies and that their national legislation conforms with the requirements of the Outer Space Treaty. The overarching research question of this work could be simplified as asking whether that is true? However, there is of course more to it than that as evidenced by the breadth and depth of this work.

10.2.1 Does a national space resources property rights regime constitute national appropriation by means of sovereignty or any other means as found in Article II of the Outer Space Treaty?

Modern legal scholarship takes the view that property is about rights between people in relation to ‘things’, and therefore ‘property’ is a grouping or constellation of elements or rights. Property is both an institution and an idea and one that is different from other rights like freedom of speech as “property involves *allocation*: with regard to property, *the giving to one person necessarily denies or takes from another*.” The protection of rights like freedom of speech are ‘cheap’ to society as protecting one person’s freedom of speech does not take anything away from another person. The protection of property is different, however. “If the enjoyment of a particular good by one person is protected, then the enjoyment of that same good by others is denied. The extension of property protection to one person *necessarily and inevitably* denies the

¹¹⁶⁹Lyall and Larsen, *Space Law* (n 18), 567

same right to others” (emphasis in original).¹¹⁷⁰ Property “is, in its essence, the resolution of *conflicting* claims” (emphasis in original). Therefore, the state takes an active role by denying claims and allocating rights to specific persons. Therefore “the state cannot simply be the ‘watchman’ for this right. It cannot protect without intervening. Property rights are, by nature, *positive* rights, *allocative* rights” (emphasis in original).¹¹⁷¹

Property is the state sanctioned allocation of resources. Therefore, if a State grants property rights over resources *in situ* in a celestial body then that State has appropriated part of that celestial body. This would be a violation of Article II of the Outer Space Treaty. It is clear that both the United States and Luxembourg recognize this danger, their legislation focuses on regulating activity, not granting property rights. Whether granting or recognizing property rights over space resources once they have been separated from the celestial body constitutes ‘national appropriation’ of ‘Outer Space, including the Moon and other celestial bodies’ is a key question. Since the enactment of the US space resources legislation in 2015 and the subsequent discussions during several sessions of the Legal Subcommittee of UNCOPUOS a view among the international community has, at least, begun to emerge that resources are capable of being appropriated once they have been extracted from a celestial body. Granted there is still not an international consensus about who has the authority to authorise such activities (i.e. whether an individual State can ‘unilaterally’ authorise such appropriation or whether it needs to be done by an international regime or body *a la* the International Seabed Authority) but that resources are separable from their celestial body and become appropriable thereafter is generally accepted by States and

¹¹⁷⁰Laura S. Underkuffler-Freund, ‘Property: A Special Right’ (n 736), 1038-1039

¹¹⁷¹*Ibid*, 1042

is in the process of ‘crystallising’. It is also important to recall, as argued, that a key aspect of Article II OST is that it prevents use or occupation from being used as a basis for establishing ownership, not that it is meant to prevent use or occupation.

Therefore, a national property rights regime is certainly capable of ‘appropriating’ the Moon or a celestial body if poorly structured. However, if national property rights regime protects property acquired after it has been extracted from a celestial body then it does not constitute ‘national appropriation’. That said, it is impossible for a State to protect resources *in situ*, ‘mining claims’ or other area based ‘property rights’, at least not from space resource operators from other States. To claim a right to protect resources, ‘mining claims’ or other area based ‘property rights’ in or on a celestial body would constitute national appropriation. Therefore, if States desire protection for the space resource activities of their nationals beyond protecting the ownership rights over extracted materials they need to develop an international framework such as that proposed by The Hague Space Resources Governance Working Group. This would enable the coordination of the authorising of activities and the mutual recognition of ‘mining claims’ and ‘priority rights’ without necessitating the exercise of territorial jurisdiction (which would constitute national appropriation) over the area in question. All States involved in such an international regime would be exercising their personal jurisdiction over their nationals.

10.2.2 What is the legal definition of a celestial body and are asteroids celestial bodies?

The phrase ‘celestial body’ is used throughout the Outer Space Treaty and the broader body of space law. It is usually used in association with ‘outer space’ and/or ‘the Moon’ as in Article I of the Outer Space Treaty which declares that the freedom of exploration and use applies to “outer space, including the Moon and other celestial

bodies.” However, there is no definition for the term provided in the Outer Space Treaty or any other instrument of space law.

According to the VCLT a treaty needs to be interpreted in accordance with the ordinary meaning of the terms within the context of its object and purpose. If the meaning remains unclear recourse can be made to the preparatory work of the treaty. However, all of this need to be done with regard to the treaty as a whole, not just that specific term or article, and it needs to consider the context, and the object and purpose of the treaty. Recourse can be made to dictionaries to find the ‘ordinary meaning’, even specialist dictionaries, and indeed the courts have done so.¹¹⁷² Finally and on that note it is important to note that Article 31(4) VCLT states that ‘a special meaning shall be given to a term if it is established that the parties so intended.’¹¹⁷³ Richard Gardiner says that “the most obvious evidence of such an intention is inclusion of a definition article.”¹¹⁷⁴

The term celestial body does not appear in the *Oxford English Dictionary*, requiring an examination of its component parts. The *Concise Oxford English Dictionary* defines ‘celestial’ as something “positioned in or relating to the sky or outer space”¹¹⁷⁵, with ‘space’ being defined as the area beyond the Earth’s atmosphere containing all of the planets, stars, galaxies, in short the rest of the universe.¹¹⁷⁶ The term ‘body’ is defined by *Oxford* as “the main or central part of something, a mass or a collection”¹¹⁷⁷. From this it is reasonable to regard the ‘dictionary definition’ of the term ‘celestial body’ as ‘the main or central part of a naturally occurring mass that is located beyond the Earth’s atmosphere.’

¹¹⁷²Gardiner *Treaty Interpretation* (n 26), 186-189

¹¹⁷³VCLT (n 157), Article 31(4)

¹¹⁷⁴Gardiner *Treaty Interpretation* (n 26), 183

¹¹⁷⁵*Concise OED* (n 58), 228

¹¹⁷⁶*Ibid*, 1381

¹¹⁷⁷*Ibid*, 154

The scientific community categorizes natural objects in the solar system into three broad categories (ignoring the Sun). These are planets, moons and small solar system objects.

Planets and moons are reasonably well defined by the scientific community, the controversy over Pluto, notwithstanding. However, the third category of ‘small solar system objects’ is more of an ‘everything else’ categorization with some hazy definitions.

Although planetary scientists have come to realize that the boundaries are somewhat blurred, these ‘junk’ objects can be divided into three broad classes: asteroids, trans-Neptunian objects, and comets.¹¹⁷⁸

An asteroid can be defined as “one of the small planetary bodies (also known as minor planets or planetoids) that mainly, but not exclusively, populate the region of the solar system between the orbits of Mars and Jupiter.”¹¹⁷⁹

A comet is a ‘small solar system body’ with a highly eccentric orbit, that goes from periods close to the sun to often far out into the reaches of the solar system. The comet’s core is generally just a chunk of dusty ice only a few kilometres across.¹¹⁸⁰

Beyond Neptune, small icy bodies become common, these object form what is known as the ‘Kuiper Belt.’ Together with ‘Scattered Disk’ objects these make up the ‘trans-Neptunian objects’ (TNOs) which have a mass “200 times that of the asteroid belt (one-fifth of an Earth-mass), and in total there may be nearly 100,000 bodies more than 100 kilometres in size.” Pluto and Eris are both ‘Dwarf Planets’ and Trans-Neptunian objects.¹¹⁸¹

¹¹⁷⁸Rothery *Planets* (n 503), 13

¹¹⁷⁹*The Asteroid Hazard* (n 81), 303

¹¹⁸⁰Rothery *Planets* (n 503), 15

¹¹⁸¹*Ibid*, 14-15

Astronomical terms themselves are vague and “any small sized body orbiting the Sun could be defined as an asteroid.”¹¹⁸² Furthermore, the core or nuclei of a comet may over time become what would be classified as an asteroid as it is baked and stripped of its icy exterior by the Sun.¹¹⁸³ Indeed, “some near-Earth objects are probably defunct comets with remnant water-ice surviving beneath their dusty surfaces.”¹¹⁸⁴

“Asteroids range downwards in size from 950 kilometres across (the diameter of Ceres, the largest example), with no lower limit.”¹¹⁸⁵

Determining asteroid’s size, mass and density, is hard and does not provide a firm enough basis for legal system of classification¹¹⁸⁶ Spectrometric observations not reliable to commercial standard, for example, Mikael Granvick et al state that M-class asteroids were thought to be primarily Iron (Fe) and Nickel (Ni) but it turns out that they have much more silicate content that was thought.¹¹⁸⁷ Therefore science does not provide a solid foundation for creation of legal categories.

The ‘ordinary meaning’ of the term celestial bodies as gleaned from dictionary definitions is a broad meaning which encompasses all natural objects in outer space. A reasonable ‘ordinary meaning’ definition is ‘the main or central part of a naturally occurring mass that is located beyond the Earth’s atmosphere.’ Furthermore, the scientific term ‘small solar system body’ is a broad term which includes a variety of objects in the solar system, essentially anything which has mass but is not a planet or a moon (or the Sun), and there is no lower limit on the size of an asteroid.¹¹⁸⁸ Additionally, there is no evidence in the treaty or the preparatory material to support

¹¹⁸²*The Asteroid Hazard* (n 81), 72

¹¹⁸³*Lewis Asteroid Mining 101* (n 83), 32; *Rothery Planets* (n 503), 15

¹¹⁸⁴*Rothery Planets* (n 503), 108

¹¹⁸⁵*Ibid*, 13

¹¹⁸⁶Kaasalainen and Durech, ‘What’s Out There?’ (n 544), 131-150; Elvis, ‘Prospecting Asteroid Resources’ (n 82), 81-129, 87-88

¹¹⁸⁷Granvick et al, ‘Earth’s Temporarily-Captured Natural Satellites’ (n 545), 151

¹¹⁸⁸*Rothery Planets* (n 503), 13

the notion that any naturally occurring object in space escapes the ‘celestial body’ category. It is important to recall that the Outer Space Treaty applies to ‘outer space’ broadly and as a blanket term, the Moon and celestial bodies are *included* in that scope not additions to it. Further, ‘celestial bodies’ are not included as part of a list but used as a general catchall term, there is no reason to exclude any bodies, the drafters could have provided a more extensive list, such as planets, moons, etc but they did not. It is important to recall that Article 31(4) VCLT states that ‘a special meaning shall be given to a term if it is established that the parties so intended.’¹¹⁸⁹ Richard Gardiner says that “the most obvious evidence of such an intention is inclusion of a definition article.”¹¹⁹⁰ The lack of a clear intention to impart a specialist meaning to the phrase celestial bodies provides certainty that it should be used in a broad all-encompassing manner as indicated by the ‘ordinary meaning’ of the term.

Therefore, while there is no ‘legal definition’ of celestial bodies per se it is clear that the term should be defined as covering any naturally occurring mass in outer space with no lower or upper size limit. The non-appropriation principle applies equally to all these objects, which absolutely includes asteroids of all sizes.

10.2.3 Does the distinction between personal and territorial jurisdiction/sovereignty allow for the development of a legal regime to govern space resource activities?

Jurisdiction is a central feature of state sovereignty. While it is predominantly territorial in nature, particularly in modern international law. However, there are circumstances in which a State can exercise jurisdiction outside of its territory. The most relevant to regulation of activities in outer space is known as the nationality principle. That “a State can legislate to regulate activities of its nationals abroad” is a

¹¹⁸⁹VCLT (n 157), Article 31(4)

¹¹⁹⁰Gardiner *Treaty Interpretation* (n 26), 183

well-established principle.¹¹⁹¹ Indeed, nationality is a logical basis for jurisdiction in a regime so concerned with sovereignty.¹¹⁹² The nationality principle is older than the territoriality principle, however the centrality of territory to the modern (Westphalian) State give pre-eminence to the territoriality principle.¹¹⁹³

However, in order for state to exercise jurisdictional authority beyond its territorial limits there needs to be a link between the State and the activity it seeks to regulate.¹¹⁹⁴

This can be by virtue of having an effect on the State in question, the nationality principle, or some other basis. International law leaves states a fair margin of discretion here¹¹⁹⁵ and with regards to outer space the OST provides at least two foundations, via Article VI and Article VIII.

Owing to Article II of the Outer Space Treaty a territorial basis for the exercise of jurisdiction can be ruled out, as in order to exercise jurisdiction over territory the state would have to acquire it and therefore violate the non-appropriation principle. Personal jurisdiction or the nationality principle is the approach that States need to take with regards to outer space

Jurisdiction is vital indeed, Csabafi states that the exploitation and use of outer space is “unimaginable without the extension of state authority or jurisdiction to the areas or spatial zones affected.”¹¹⁹⁶ However, it needs to be done in such a manner as to be consistent with Article II of the Outer Space Treaty and the other obligations in the law of outer space and international law more broadly.

States can regulate the activities of their nationals in outer space using personal jurisdiction as the basis for the exercise of this authority without violating Article II

¹¹⁹¹Aust *Handbook of International Law* (n 941), 43

¹¹⁹²Shaw *International Law* (n 872), 479

¹¹⁹³Staker ‘Jurisdiction’ (n 933), 318-319

¹¹⁹⁴Staker ‘Jurisdiction’ (n 933), 315

¹¹⁹⁵Aust *Handbook of International Law* (n 941), 42

¹¹⁹⁶Csabafi *The Concept of State Jurisdiction in International Space Law* (n 366), 130

of the Outer Space Treaty. The exercise of personal jurisdiction is claiming authority over a person or legal entity not territory and therefore does not constitute 'national appropriation'. Indeed, under Article VI of the Outer Space Treaty States have an obligation to exercise jurisdiction over their nationals (natural or legal) in order to fulfil their obligation to 'authorise and supervise' their activities in outer space or on the Moon or any other celestial bodies. Authorisation and regulation of activities is not only within the sphere of a States powers over its national in outer space it is an obligation under international law. This includes regulation of their property in outer space. Where issues arise under international law is the 'granting' or 'protecting' of property rights over resources *in situ* or while they remain part of a celestial body. As discussed the international community has accepted that resources can be separated from their celestial body and are appropriable once this has occurred but to claim ownership before this process would be appropriation and a violation of Article II of the Outer Space Treaty. Of course, one of the consequences of utilizing personal jurisdiction as the basis of authority for regulating space resource activities is that it only applies to the nationals of an individual State. Therefore, the United States can only regulate the activities of those under the jurisdiction of the United States (which in this context means corporations, citizens, and permanent residents). It also means they can only protect the 'mining claims' of US nationals and entities from other US national and entities by refusing to grant licences to conduct activities within overlapping operating areas. Therefore it would be prudent, if not necessary, for those States pursuing space resource activities to develop some sort of international framework, such as that proposed by The Hague International Space Resources Governance Working Group, to ensure mutual recognition of claims, operating areas, and property rights.

10.3 Solution

There is a natural inclination to propose a new treaty, to suggest the necessity of creating an ‘International Seabed Authority’ for outer space, and such a proposal would solve a number of problems. However, beyond the political impossibility of drafting and ratifying such a treaty, it is not necessarily the best approach, at least at this time. As has been argued, informal property rights and management systems can operate successfully, particularly where the value of investment is high, the community is small, and there is considerable incentive to cooperate. This was seen in the gold fields of California and the American West in the 19th century, it is likely to be repeatable in outer space.

Furthermore, while it is true that formal property rights do facilitate investment, it is important not to get too obsessed with the vehicle but consider the destination. Property rights are about protecting interests, they are about ensuring that Space Mining Company Ltd. can protect the investment they have made in extracting resources from Asteroid X. That they do not have to worry about ‘claim jumping’ or overlapping operational areas. This does not necessarily require a formal property rights regime, particularly while the industry remains embryonic. Further, prematurely establishing a formal, hard law regime will undoubtedly result in unwanted outcomes; it is economically more efficient to allow experimentation, to allow evolution and then codify what has developed when the time is right.

However, this is absolutely not something that an individual state can do alone. While Luxembourg (or the United States) can authorise space resource activities and they can prevent overlapping operational areas between companies they exercise jurisdiction over, they have limited recourse for foreign companies. Granted, the Outer Space Treaty does require the ‘avoidance of harmful interference’ with the activities

of other States, but an established mechanism for coordinating such avoidance would facilitate the process. Therefore, an endorsement of The Hague International Space Resources Governance Working Group Building Blocks for the Development of an International Framework on Space Resource Activities is a logical conclusion of this work. They are not perfect, however the conception of ‘priority rights’¹¹⁹⁷ and the ‘registry’¹¹⁹⁸, among others, solve a number of problems. Further they endorse an evolutionary approach, recognizing the limitation of knowledge about space resources and the process necessary for extracting and utilizing which is why the Building Blocks utilize the notion of ‘adaptive governance’.¹¹⁹⁹ It is recommended to adopt the Building Blocks as a ‘soft law’ instrument, and it is regarded as somewhat irrelevant whether it is adopted by States or as some sort of ‘industry association’ by the space resources sector. Eventually a formal institution akin to the International Seabed Authority will likely want to be considered but it is premature to discuss such steps.

10.4 Further Work

The debate is moving on, as argued, international law is changing, and this is likely to be one of the last anticipatory work on space resource property rights. The question of whether space resource activities are legal is being settled, its days as an academic question are limited. That said, there is still a lot of work to be done. Several aspects that have been identified are a clear need for work on the distribution of space resources and the equity of access and use. This is particularly important given the ‘interests and benefits’ provision of Article I of the Outer Space Treaty. However, this work requires a better understanding of the composition of the small solar system bodies to be provided by planetary science.

¹¹⁹⁷The Hague Working Group Building Blocks (n 61), Building Block 7

¹¹⁹⁸*Ibid*, Building Block 14

¹¹⁹⁹*Ibid*, Building Block 4.2(a)

Further, and in line with the notions of stewardship that were explored within this work are questions of ‘environmental protection’, granted this perhaps applies more to planetary environments than asteroids and comets but there it is worthwhile exploring the legal basis for protecting areas of scientific interest and natural beauty (there are further questions, such as how to ensure compliance with things like the non-binding planetary protection guidelines, particularly as sources of water in space are key targets both for the resource community but also the astrobiology community.) Similarly, there is need for consideration of ‘unique environments’ like the so-called ‘peaks of eternal light’ in places like the lunar south polar region. These areas are resources by themselves in addition to the resources contained there. It may be necessary to treat them as special areas and establish a specific regime for them as has been done with the Geostationary Orbit. Of course, the Moon itself could be considered a ‘unique environment’ and be considered worthy of special protection. Finally, a future work should, and will undoubtedly, focus on actual mechanisms for creating an international regime for space resources. Given this work’s endorsement of The Hague Group’s work it would be the hope that they would serve as a framework for such an enquiry but also further examination of the UNCLOS regime, as well as the ITU framework and other similar systems would be prudent.

10.5 Concluding Remarks:

Space resource activities are permitted under international law. Article I of the Outer Space Treaty is a broad and permissive freedom of use of outer space and one of those uses is the extraction and utilization of resources found in and on the Moon and other celestial bodies. This is true for both States and non-governmental actors. However, States are required to ‘authorise and supervise’ the activities of their nationals and are responsible, under international law, for those activities. These activities cannot be

conducted without restriction. The most notable restriction on the ‘freedom of use’ of outer space is the non-appropriation principle codified in Article II of the Outer Space Treaty. However, there are other restrictions such as the provision calling for the avoidance of ‘harmful interference’ found in Article IX. Ultimately the Outer Space Treaty is intended to facilitate not thwart the future of humanity in outer space. However, it also desires to ensure that that future is better than the human past. Wars over resources plague our history, and with the rise of various space forces and the growing fragility of the international order we look in danger of spreading that plague to outer space. We can choose not to, we can choose cooperation and coordination, rather than competition and confrontation. The Outer Space Treaty is a product of the Cold War, it is true, but that means that two ideological enemies in the heat of deadly competition were able to get together and produce a framework for peaceful coexistence in outer space that has lasted over fifty years. It is worth preserving.

However, that does not mean fossilizing. Law evolves, institutions evolve. As has been demonstrated, property, sovereignty, and the State are concepts and institutions which have developed and evolved over hundreds, even thousands of years. They have adapted and changed to meet new developments and new environments. This in particular has been true on the ‘frontier.’ Innovations such as the approach to water rights and the development of Torrens titles changed the nature of property and spread throughout the world. English property law encountered a radically different set of circumstances from that in which it had developed and changed as a result. Sovereignty has evolved from being synonymous with the power of the king to being a multifaceted complex concept in the twenty-first century. Therefore, it should be expected that property and sovereignty will evolve in the unique and challenging environment of outer space.

It is important that this evolution and development occurs with the input and ownership from a variety of stakeholders. A key aspect of securing the legitimacy of these development is recognizing that industry is not the only stakeholder. This should be particularly clear and important given the evidence of the growth at all costs approach that has devastated the terrestrial environment. Sustainability should be the watchword of space development and space law. The use of space is the province of all humanity and should be conducted in the interests and for the benefit of all. That has to mean something. This cannot be yet another plunder conducted by the wealthy and power States. It is imperative that the use of these resources is well managed. As Elvis and Mullins have indicated it is possible that humanity could exhaust the resources of the solar system faster than anticipated. Once these resources have been exhausted there are no real options for replacing them. The resources of the solar system offer immense possibilities for the future of humanity, therefore there is an obligation to create a regime that ensures the fulfilment of that possibility which must ensure fair and equitable use of the available resources in a peaceful and sustainable manner. These things will not just happen, but they need to be brought about by law and policy, and ultimately political will.

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