

# Developing and Adapting Space Law to Govern Long Term and Permanent Human Settlement of Outer Space, the Moon and Other Celestial Bodies

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## Abstract

From ESA's Moon Village to Elon Musk's Martian cities, there is increasing talk of establishing permanent human settlements or outposts in outer space. November 2018 will mark 18 years of continuous human presence in space via the International Space Station (ISS). However, these new proposals are different for several reasons. They are intended to have a permanence never envisioned for the ISS, they are intended to be 'home' to more than professional astronauts and fewer than a handful of space tourists, and they will be located on the Moon and other celestial bodies. The ISS is treated by the existing space law regime as a space object, or an assembly of separate space objects, regarded as functionally no different from any other space object. However, whether this approach could be taken for facilities on the Moon and other celestial bodies is the proposed focus of this paper. None of the space law treaties provide a precise definition of the term 'space object', however the generally accepted understanding is that "space objects may be defined as artificial man made objects that are brought into space and are designed for use in outer space."<sup>1</sup> That is not to lament the lack of a specific definition, as it would most likely be disadvantageous to have been lumbered with the 1967 conception of 'space object'. The nonspecificity of the treaties allow scope for development and adaptation to deal with the uses now

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- 1 Stephan 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), 32

proposed. Article VIII of the Outer Space Treaty potentially provides aid in this quest as it indicates that ‘objects constructed on a celestial body’ fall within the scope of ‘space object’. Therefore, it is most likely possible to construct a regime providing a legal basis for governance of space settlements and outposts utilizing the existing ‘space object’ concept. However, there will still be potential issue around the non-appropriation principle codified in Article II of the Outer Space Treaty. Which this paper will also explore. This is a topic which is vital for the maintenance of the existing space law regime and is of growing relevance as more proposals for permanent human presence are made.

## Introduction

Most of the discussion surrounding a permanent human presence in outer space focus on the technical or physical challenges of making a life in the hostile environment of outer space. However, it is important to consider the governance of these settlements too. Human societies are complex and breakdown in governance can be just as hazardous, if not more so, than breakdown in equipment. The models utilized so far, effectively a form of military command structure, will not be suitable for permanent settlements especially if the inhabitants come from liberal democracies. Furthermore, many of the issues involved, particularly regarding the concepts of the state and state creation have value and interest for international law more broadly. Furthermore, space law needs to be relatively proactive, especially as one of the fundamental values of space law is the preservation of space as a peaceful realm of human activity. Ensuring the maintenance of the rule of law in outer space is vital to this and as Andrew Haley, one of the ‘fathers of space law’ wrote in 1962 “...as the future beckons man into outer space, man must look there too for the rule of law. If he does not, the consequences may be fatal: ‘A world without law is hell-bent for destruction with or without scientific discoveries.’”<sup>2</sup>

There are a number of potential legal issues to address. Article II of the Outer Space Treaty (OST) and the non-appropriation principle codified within it is one of the main potential hurdles as it prohibits the appropriation of outer space, the Moon, or other celestial bodies by means of use, occupation, or any other means. However, the concept of a ‘space object,’ though poorly defined and seemingly dependent upon being launched into outer space, potentially offers a way to build a legal framework for colonies and settlements that would, in essence, be analogous to the ISS governance framework. That said there are still several issues about people living, working, visiting, these settlements as the status of ‘astronaut’ is unclear, additionally there are potentially overlapping jurisdictions between the nationality of the astronaut and the state of registry of the ‘space object.’ Furthermore, there are potential issues in the longer term around self-

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2 Andrew Haley, *Space Law and Government* (Appleton-Century-Crofts: 1963), 15

determination, identity, nationalism, and state creation. This requires a broader view than just legality especially with regards to nationalism, but the process for creating a state in space given not just Article II OST but also Article VI's requirement for a state to 'authorise and supervise' the activity of their nationals in space will be complex and potentially require a paradigm shift in space law. It is also important to note that all international law, including the rules on state creation, apply, thanks to Article III OST, of course, this also implies that Mars colonists have just as much right to 'self-determination' as Namibians and Falkland Islanders. This paper will provide a concise overview of these issues.

### Space Law

The space law regime is centred the five main 'UN space law' treaties<sup>3</sup>, the first four of which have broad acceptance. The Outer Space Treaty is by far the most dominant and relevant of the space law treaties as it has been ratified by 107 states and signed by a further 23<sup>4</sup>. The Outer Space Treaty has been described as the 'constitution'<sup>5</sup> or the 'Magna Carta'<sup>6</sup> of outer space and many of its provisions are considered to be customary international law, most specifically Articles I-III and VI but an argument can certainly be made for the rest of the provisions of the treaty having also achieved that status, given its broad acceptance.<sup>7</sup> The Rescue Agreement and also the Liability Agreement have been accepted by over 90 states and the Registration

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3 Outer Space Treaty; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (adopted 22 April 1968, entered into force 3 December 1968) 672 UNTS 119 (Rescue Agreement); Convention on International Liability for Damage Caused by Space Objects (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187 (Liability Convention); Convention on Registration of Objects Launched into Outer Space (adopted 14 January 1975, entered into force 15 September 1976) 1023 UNTS 15 (Registration Convention); 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 (Moon Agreement/MA)

4 UNCOPUOS 'Status of International Agreements Relating to Activities in Outer Space as at 1 January 2018' (9 April 2018) UN Doc A/AC.105/C.2/2018/CRP.3

5 Thomas Gangale *The Development of Outer Space: Sovereignty and Property Rights in International Space Law* (Praeger 2009), 52

6 Stephan Hobe, 'Historical Background' in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn. Carl Heymanns Verlag 2009), 14; Francis Lyall and Paul B. Larsen *Space Law: A Treatise* (Ashgate 2009), 53

7 Paul B. Larsen, 'Asteroid Legal Regime: Time for a Change?' (2014) 39 J. Space L. 275, 289; Francis Lyall and Paul B. Larsen *Space Law: A Treatise* (Ashgate 2009), 54, 71, 180, 184

Convention has been accepted by nearly 70 states.<sup>8</sup> By contrast the Moon Agreement has been ratified by only 18 states and signed by a further four states.<sup>9</sup> While the Moon Agreement is largely regarded as a ‘failed treaty’<sup>10</sup> it does still contain relevance for this enquiry and therefore will be discussed below.

The key provisions of the Outer Space Treaty, or at least those most relevant for this paper, are found in Article I-III, VI and IX. Article I of the Outer Space Treaty is one of the two most important articles. Article I establishes the freedom of exploration, access and use of outer space for all countries. Article II of the Outer Space Treaty codifies the non-appropriation principle that was first established in UN Declaration 1721.<sup>11</sup> It establishes that “outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”. This was one of the earliest and most widely agreed principles of space law<sup>12</sup>. Articles I and II work in conjunction and are what make space *res communis* and not *res nullius*. Both articles are regarded as having attained the states of customary international law (indeed given the pre-existing UN Declarations they may have been reflective of customary international law even in 1967) and some have even gone so far as to argue that Article II has attained the status of a *jus cogens* norm<sup>13</sup>, although the case for that is wanting.

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- 8 UNCOPUOS ‘Status of International Agreements Relating to Activities in Outer Space as at 1 January 2018’ (9 April 2018) UN Doc A/AC.105/C.2/2018/CRP.3
  - 9 UNCOPUOS ‘Status of International Agreements Relating to Activities in Outer Space as at 1 January 2018’ (9 April 2018) UN Doc A/AC.105/C.2/2018/CRP.3
  - 10 Gennady M. Danilenko (2016) ‘International Law-making for Outer Space’ 37 *Space Policy* 179, 180; Steven 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), 17-18
  - 11 UNGA Res 1721 (20 December 1961) UN Doc A/RES/1721 (XVI), A1(b)
  - 12 Fabio Tronchetti ‘Legal Aspects of Space Resource Utilization’ in Frans von der Dunk and Fabio Tronchetti eds. *Handbook of Space Law* (Edward Elgar 2015), 778; Steven Freeland and Ram Jakhu ‘Article II’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds. *Cologne Commentary on Space Law*, vol 1 (1st edn. Carl Heymanns Verlag 2009), 46-47; 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; Paul G. Dembling and Daniel M. Arons (1967) ‘The Evolution of the Outer Space Treaty’ 33 *J. Air L. + Comm.* 419, 421-422; Paul G. Dembling and Daniel M. Arons (1966) ‘The United Nations Celestial Bodies Convention’ 33 *J. Air L. & Com.* 535, 535-537
  - 13 Ricky J. Lee *Law and Regulation of Commercial Mining of Minerals in Outer Space* (Springer 2012), 125-126; Steven Freeland and Ram Jakhu ‘Article II’ in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds. *Cologne Commentary on Space Law*, vol 1 (Carl Heymanns Verlag 2009), 55

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.” Article VI of the Outer Space Treaty makes states responsible for the actions of their nationals in outer space. Governments are required to authorize and continually supervise their activities. This is usually a main feature of national space legislation such as the UK’s Outer Space Act<sup>14</sup> or Australia’s Space Activities Act<sup>15</sup>. It is through Article VI of the Outer Space Treaty that the non-appropriation principle found in Article II of the Outer Space Treaty applies to corporations and natural persons as well as states.<sup>16</sup> Article IX of the Outer Space treaty requires states to avoid the harmful contamination of outer space, the Moon and other celestial bodies and harmful interference with activities of other States Parties.

The Rescue Agreement is the second of the five main United Nations space treaties and entered into force just over a year after the Outer Space Treaty in December 1968. It expands upon the provisions of Article V of the Outer Space Treaty which requires states to render assistance to astronauts in distress whether they are in space or the surface of the Earth. Neither the Outer Space Treaty nor the Rescue Agreement provide a definition of the term ‘astronaut,’ in fact, the Rescue Agreement prefers to use the phrase ‘personnel of a spacecraft,’ although it also fails to define that phrase. Furthermore, the Rescue Agreement does not include the phrase ‘envoys of mankind,’ that is only found in Article V of the Outer Space Treaty. While it may be frustrating for there to be a lack of definitions of these key terms in the Outer Space Treaty and the Rescue Agreement it does allow for flexibility in the application of the treaties as it avoids the issue of too precise a definition not being able to take into account future developments (such as payload specialists, a role ‘invented’ for the US Space Shuttle).<sup>17</sup>

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14 Outer Space Act 1986, Chapter 38

15 *Space Activities Act 1998* (Cth)

16 Fabio Tronchetti ‘Legal Aspects of Space Resource Utilization’ in Frans von der Dunk and Fabio Tronchetti eds. *Handbook of Space Law* (Edward Elgar, 2015), 780; Irmgard Marboe ‘National Space Law’ in Frans von der Dunk and Fabio Tronchetti eds. *Handbook of Space Law* (Edward Elgar, 2015), 131; Paul B. Larsen ‘Asteroid Legal Regime: Time for a Change?’ (2014) 39 *J. Space L.* 275, 283, 287; Francis Lyall and Paul B. Larsen *Space Law: A Treatise* (Ashgate 2009), 66; 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, 129

17 Irmgard Marboe, Julia Neumann, Kai-Uwe Schrogl, ‘The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space’ 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), 10, 15

Of course, one of the longer-term issues with regarding all humans in space as ‘astronauts’ is whether it is appropriate for those who will make space their homes. While it is easy to dismiss this as a concern for the far future there are already discussions and plans about villages on the Moon and cities on Mars.<sup>18</sup> While it is an interesting point to consider the fact that ‘envoy’ means someone who returns from a journey<sup>19</sup>, it is not impossible to consider permanent settlers as ‘representatives’ of humanity, which is an alternative, albeit, less precise understanding of the term envoy. Especially as the people we are talking about will be the first humans to make their homes outside of the ‘cradle of humanity.’

It is also worth considering a potential useful nature of taking broad definitions of the terms ‘astronaut’ and ‘personnel of a spacecraft’ while it does not necessarily seem logical to consider a colonist as ‘personnel of a spacecraft’ or an ‘astronaut’, utilizing the legal concept of the ‘space object’, particularly given Article VIII of the Outer Space Treaty, would be a convenient way of creating a legal governance regime for space settlements, outposts and colonies without requiring significant overhaul of the space law regime. There will come a time when the space law regime needs to undergo a paradigm shift to deal with the developments of human activity in outer space, however this is a suitable ‘stop gap’ measure.

The Liability Convention is the third UN space law treaty, and deals with liability for damage caused by space objects. The key point for this enquiry is found in Article I which declares that the term ‘space object’ “includes component parts of a space object as well as its launch vehicle and parts thereof.”<sup>20</sup> Article III establishes that for damages ‘in space’ a fault-based liability regime operates. However, it is States that are liable under international law and parties to the space law treaties, particularly given the provisions of Article VI of the Outer Space Treaty requiring them to ‘authorise and supervise’ the activities of their nationals in outer space. The Iridium 33/Kosmos-2251 2009 collision highlights the imperfection of the

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18 Ian Sample, ‘Is a Moon Village the Next Step for Space Exploration? ESA’s Chief Thinks So’ *The Guardian* (23 September 2016) < <https://www.theguardian.com/science/2016/sep/23/is-a-moon-village-the-next-step-for-space-exploration-esas-chief-thinks-so> > accessed 12 May 2018; Loren Grush, ‘Elon Musk Teases Pictures of a SpaceX Moon Base and Martian City’ *The Verge* (28 September 2017) <<https://www.theverge.com/2017/9/28/16382716/spacex-elon-musk-moon-base-alpha-mars-colonization-interplanetary-transport-system>> accessed 12 May 2018; ‘Elon Musk Unveils Plan to Build City on Mars ‘in our lifetimes’’ *Sky News* (28 September 2016) <<https://news.sky.com/story/elon-musk-unveils-plan-to-build-city-on-mars-in-our-lifetimes-10596540>> accessed 12 May 2018

19 Jacques Arnould, ‘Does the Concept of ‘Envoys of Mankind Have a Future?’ in Gabriel Lafferranderie, and Sergio Marchisio eds., *The Astronauts and Rescue Agreement: Lessons Learned* (European Centre for Space Law, 2011), 25-34

20 Liability Convention Article I(d)

operation of the liability regime in practice and the need for an effective space situational awareness system as well as ‘Transparency and Confidence Building Measures’ such as those set out in the Registration Convention.<sup>21</sup>

The Registration Convention is the fourth of the five UN space law treaties and provides for a process for mandatory registration of space objects. While it does not exactly provide a definition of a ‘space object’ it does state that the term ‘space object’ “includes component parts of a space object as well as its launch vehicle and parts thereof”<sup>22</sup> When a space object has been launched into outer space parties to the Registration Convention are under an obligation to register the space object in “an appropriate registry”,<sup>23</sup> and the Secretary General of the United Nations needs to be furnished with information concerning the space object “as soon as practicable.”<sup>24</sup> The Registration Convention concerns itself only with objects that have been ‘launched into Earth orbit or beyond.’<sup>25</sup> The Registration Convention developed from UNGA Resolution 1721<sup>26</sup> which non-parties to the Registration Convention can use to register their space objects with the United Nations although unlike the Registration Convention, UNGA Resolution 1721 is non-binding.<sup>27</sup>

As mentioned above, the Moon Agreement is generally regarded as being a ‘failed treaty’ due to its low uptake and the lack of any major spacefaring power (i.e. the United States and the USSR/Russia) as either a party or signatory. However, having achieved the required number of ratifications it is a valid, active treaty and indeed it is still gaining new parties, Venezuela became a party to the treaty as recently as November 2016.<sup>28</sup> For the most part the Moon Agreement replicates the Outer Space Treaty; however, it has a few variations that are worth looking at. For the most part Article 11 largely expands upon the provisions of Article II of the Outer Space Treaty.

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21 Michael Listner, ‘Iridium 33 and Cosmos 2251 three years later: where are we now?’ (*The Space Review*, 13 February 2012) <<http://www.thespacereview.com/article/2023/1>> accessed 12 May 2018; Brian Weeden, ‘2009 Iridium-Cosmos Collision’ (Secure World Foundation, 10 November 2010) <[https://swfound.org/media/6575/swf\\_iridium\\_cosmos\\_collision\\_fact\\_sheet\\_updated\\_2012.pdf](https://swfound.org/media/6575/swf_iridium_cosmos_collision_fact_sheet_updated_2012.pdf)> accessed 12 May 2018

22 Registration Convention Article I(b)

23 Registration Convention Article II(1)

24 Registration Convention Article IV(1)

25 Registration Convention Article II(1)

26 UNGA Res 1721 (20 December 1961) UN Doc A/RES/1721 (XVI), A1(b)

27 Tanja Masson-Zwaan, ‘The International Framework for Space Activities’ in Christopher D. Johnson (eds.) *Handbook for New Actors in Space* (Secure World Foundation 2017), 10-12

28 UNOOSA, ‘Accession by Venezuela (Bolivarian Republic of) to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies’ (3 November 2016) UN Doc C.N.829.2016.TREATIES-XXIV.2 (Depositary Notification)

However, Article 11, section 1 declares that “the Moon and its natural resources are the common heritage of mankind”, this is the infamous ‘common heritage of mankind’ principle that can also be found as a distinct concept in the Law of the Sea Convention. There is also the provision in section 5 for the establishment of an international regime to “govern the exploitation of the natural resources of the Moon...” and the provision in section 7(d) for “an equitable sharing by all States Parties in the benefits derived from those resources...”

### **‘Astronaut’ and ‘Personnel of a Spacecraft’**

Neither the Outer Space Treaty nor the Rescue Agreement define the term ‘astronaut,’ and indeed the Rescue Agreement uses the term ‘personnel of a spacecraft’ instead, which is also not explicitly defined. Owing to the lack of definition provided by the treaties themselves, Article 31 of the Vienna Convention on the Law of Treaties requires that treaty terms “be interpreted in good faith in accordance with their ordinary meaning” in line with the object and purpose of the treaty. Therefore, in considering the meaning of the terms ‘astronaut’ and ‘personnel of a spacecraft’ it is sensible to look at the dictionary definitions of those terms as well as their use in other areas of similar activity, the general understanding of those terms, and their use in legislation and international agreements. Furthermore, while the *Cologne Commentary* regards the terms ‘personnel of a spacecraft’ and ‘astronaut’ as being virtually identical,<sup>29</sup> and it is reasonable to do so, it is worth examining whether there is indeed any difference, and if so, what might that be and what might that mean.

As for dictionary definitions, at the very least a guide to the ‘ordinary meaning’ of terms the *Concise Oxford English Dictionary* defines ‘astronaut’ as a ‘person trained to travel in a spacecraft’<sup>30</sup> and ‘personnel’ as ‘people employed in an organization or engaged in an organized undertaking’<sup>31</sup> A good faith interpretation of these terms “in accordance with their ordinary meaning” would therefore suggest that they are referring to ‘crew’ i.e. persons who have official duties and responsibilities involved with the operation of the vehicle. This would exclude persons such as ‘space tourists’ and ‘passengers.’ Therefore, it would be reasonable to take the view that the terms ‘astronaut’ and ‘personnel of a spacecraft’ “may thus be understood to

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29 Irmgard Marboe, Julia Neumann, Kai-Uwe Schrogl, ‘The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space’ 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

30 *Concise Oxford English Dictionary* (12th edn, 2011) 81

31 *Ibid* 1071



cover all persons who undertake an activity on board a spacecraft which is relevant to the accomplishment of the mission.”<sup>32</sup>

The issue of humans in space who are not ‘crew’ was not really considered at time of the drafting of the Rescue Agreement. The *Skylab* agreement was the first time it was considered, and this was for scientific personnel aboard the US Space Shuttle. The *International Space Station* governance agreements also have provisions for non-crew, including ‘private persons’ such as ‘space tourist’ Dennis Tito, under the ‘spaceflight participant’ title. They are not ‘crew’ members in the strictest sense although they do receive formal training but it does make a distinction between them and ‘passengers’ who wouldn’t expect much more than a standard aviation safety briefing.<sup>33</sup>

The term ‘personnel of spacecraft’ also appears in the Moon Agreement.<sup>34</sup> Its use in the Moon Agreement is “broad and encompasses any human being, whether professional or private person who has landed on the Moon.”<sup>35</sup> The term ‘personnel’ is also used in Article VIII of the Outer Space Treaty and its use here and throughout the various space treaties could provide support for taking the broader definition for the terms ‘astronaut’ and ‘personnel of a spacecraft’.<sup>36</sup>

### ‘Envoy of Mankind’

Astronauts are ‘envoys of mankind.’ This is only found in Article V of the Outer Space Treaty and not the Rescue Agreement, so if there is a difference between ‘astronauts’ and personnel of a spacecraft’ then the latter are not necessarily ‘envoys of mankind.’ However, this designation is “more of symbolic value and legal consequences cannot really be derived from this

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32 Irmgard Marboe, Julia Neumann, Kai-Uwe Schrogl, ‘The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space’ 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), 42

33 Stephan Hobe, ‘Space Tourism as a Challenge to the Astronaut Concept’ in Gabriel Lafferranderie, and Sergio Marchisio (eds.), *The Astronauts and Rescue Agreement: Lessons Learned* (European Centre for Space Law 2011), 77-80

34 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 (Moon Agreement/MA)

35 Irmgard Marboe, Julia Neumann, Kai-Uwe Schrogl, ‘The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space’ 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), 35-36

36 *Ibid*, 43

expression.”<sup>37</sup> Furthermore, it does not confer any kind of diplomatic status or immunity.<sup>38</sup> Nevertheless, it is worth considering the appropriateness of bestowing this title on private and commercial spacefarers regardless of their entitlement to the status of ‘astronaut’. Jacques Arnould has argued that the use of the word envoy has a specific connotation, envoys go and return, and astronauts have been designated representatives of humanity as a whole. Suggesting that the honorific ‘envoys of mankind’ should not, therefore, be applied to those who will remain permanently in outer space. Furthermore, the changing nature of the role of spacefarers does take some of the shine of them, which does raise the perfectly valid question of how relevant their status is as ‘envoy of mankind.’ Arnould also says that the concepts in the Rescue Agreement do need to be developed to deal with the new developments and expansion of space activities. Saying that the rescue and assistance provisions of space law have value, although we may need to limit who is worthy of the title ‘envoy of mankind,’ but we should not necessarily do away with that concept altogether.<sup>39</sup>

### Colonists

Of course, one of the longer-term issues with regarding all humans in space as ‘astronauts’ is whether it is appropriate for those who will make space their homes. While it is easy to dismiss this as a concern for the far future there are already discussions and plans about villages on the Moon and cities on Mars.<sup>40</sup> Additionally, as Andrew Haley warned in 1963 law must precede human activity in outer space and law is usually a slow-moving creature<sup>41</sup>, so it is worth being proactive. While it is an interesting point to consider the fact that ‘envoy’ means someone who returns from a journey, it is not impossible to consider permanent settlers as ‘representatives’ of humanity, which is an alternative, albeit, less precise understanding of the term envoy. Especially as

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37 Stephan Hobe, ‘Space Tourism as a Challenge to the Astronaut Concept’ in Gabriel Lafferranderie, and Sergio Marchisio eds., *The Astronauts and Rescue Agreement: Lessons Learned* (European Centre for Space Law, 2011), 75

38 Gabriella Catalano Sgrosso, ‘Legal Status, Rights and Obligations of the Crew in Space’ (1998) 26 J. Space L. 163, 166

39 Jacques Arnould, ‘Does the Concept of ‘Envoys of Mankind Have a Future?’ in Gabriel Lafferranderie, and Sergio Marchisio (eds.), *The Astronauts and Rescue Agreement: Lessons Learned* (European Centre for Space Law, 2011), 27-34

40 Ian Sample (2016) ‘Is a Moon Village the Next Step for Space Exploration? ESA’s Chief Thinks So’ *The Guardian* 23 September Available at: <https://www.theguardian.com/science/2016/sep/23/is-a-moon-village-the-next-step-for-space-exploration-esas-chief-thinks-so>; James Titcomb (2017) ‘Mars City: Human Missions to Space Colony Will Start in 2024, Elon Musk Says’ *The Telegraph* 29 September Available at: <https://www.telegraph.co.uk/technology/2017/09/29/mars-city-human-missions-space-colony-will-start-2024-elon-musk/>

41 Andrew Haley, *Space Law and Government* (Appleton-Century-Crofts: 1963), 11-15

the people we are talking about will be the first humans to make their homes outside of the ‘cradle of humanity.’

There are also practical considerations. There will be limited aid that an Earth based government would be able to offer a Martian settler within any kind of useful timeframe, indeed it is difficult enough to render practical assistance on low Earth orbit in the event of an emergency, those who make their lives in space do and will require a degree of self-sufficiency unknown to most of us which limits the utility of the legal obligations found in the Rescue Agreement. Additionally, while our understanding of ‘astronaut’ may not really be compatible with the reality of being a ‘settler’ or ‘colonist,’ ‘astronauts’ are space travellers not space dwellers, there isn’t anything in the Rescue Agreement that would be particularly problematic if applied to the inhabitants of one of SpaceX’s Martian cities. Indeed, it seem quite likely that given the hazards and risks that will be involved in living on Mars, another celestial body or in outer space, these pioneers would want or would devise a fairly humanitarian regime either through formal law or custom. This happens in harsh environments around the world, and when disaster strikes, even in safe, quiet English villages you help your neighbour if you are able to do so. Given the utopian and idealistic dreamers who will probably comprise the first humans to settle in space it seems more than likely that this will still be the case regardless of any legal obligations. Therefore, while it may not exactly sit comfortably to allow for a broad interpretation of the term ‘astronaut’ to include any human in space, including ‘greedy’ ‘space miners, it seems in line with the ‘object and purpose’ of the treaties to provide a protection and security for those in most need of it.

It is also worth considering a potential useful nature of taking broad definitions of the terms ‘astronaut’ and ‘personnel of a spacecraft’ while it does not necessarily seem logical to consider a colonist as ‘personnel of a spacecraft’ or an ‘astronaut’, utilizing the legal concept of the ‘space object’, particularly given Article VIII of the Outer Space Treaty, would be a convenient way of creating a legal governance regime for space settlements, outposts and colonies without requiring significant overhaul of the space law regime. There will come a time when the space law regime need to undergo a paradigm shift to deal with the developments of human activity in outer space, however this is a suitable ‘stop gap’ measure.

### **State Creation in International Law**

Of course, when considering the notion of state creation in outer space, on the Moon or any other celestial bodies it is important not just to consider the provisions of international space law but international law in general. That outer space, the Moon or any other celestial body is part of the international legal regime is incontestable owing to Article III of the Outer Space Treaty which states that activities in the exploration and use of outer space shall be

carried out in accordance with international law including the United Nations Charter.

That said, the process for creating a new state in international law is not exactly a cut and dried matter. States are the primary subjects of international law, yet the definition of both a subject of international law and of a State itself, is not exactly clear, particularly in ‘hard’ cases and where there is ambiguity and disagreement. The definition of subjects of international law is somewhat circular; a subject of international law is an entity which has rights and obligations under international law and has the capacity to maintain those rights and be held responsible for breaches of obligation. States certainly fall under this category, but certain international organizations can also do so. However, states are the primary subjects of international law, but possession of legal personality is not, in and of itself, a mark of statehood.<sup>42</sup>

“It is sometimes said that statehood is a question of fact, meaning that it is not a question of law.”<sup>43</sup> However the law does establish the criteria of statehood<sup>44</sup>, the Montevideo Convention<sup>45</sup> is the usual point of reference and is considered to have codified existing customary international law. The Montevideo Convention says that states should have a permanent population, a defined territory, an established government, and the capacity to enter into relations with other States. Independence is also usually listed as a criterion, but Crawford argues that ‘independence’ means the ability to enter into relations with other states but he also stipulates that it is the “decisive criterion of statehood.”<sup>46</sup>

With regards to the population requirement there does not seem to be any ‘minimum size’ for the population, nor despite the popularity of the concept of the ‘nation state’ is there, at least according to Matthew Craven, for that population to constitute a ‘nation.’<sup>47</sup> Similarly there seems to be no minimum size for territory, there certainly is no need for borders to be fixed, indeed borders have proven to be very fluid in many parts of the world at least until after the Second World War.<sup>48</sup> Additionally, while “time is an element of statehood” a state which has only existed for a short period is no less a state

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42 James Crawford, *Brownlie’s Principles of Public International Law* (8th edn, Oxford University Press, 2012), 115-116, 127

43 *Ibid*, 127

44 *Ibid*, 127

45 Montevideo Convention on the Rights and Duties of States (adopted 26 December 1933, entered into force 26 December 1934) 165 LNTS 19; 49 Stat 3097

46 James Crawford, *Brownlie’s Principles of Public International Law* (8th edn, Oxford University Press, 2012), 127-129

47 Matthew Craven, ‘Statehood, Self-Determination, and Recognition’ in Malcolm D Evans (eds) *International Law* (4th edn. Oxford University Press 2014), 218-219

48 *Ibid*, 219-221

than state of longer life. Statehood is not necessarily a cut and dried issue, it is not a checklist, see sticky situations like Palestine or Kosovo or Taiwan<sup>49</sup>

As far as creating new states is concerned, self-determination is often the strongest principle marshalled in favour of the creation of a new state, especially if the state is being created out of part of an existing state. As Crawford says, “if independence is the decisive *criterion* of statehood, self-determination is a principle concerned with the *right* to be a state.”<sup>50</sup> (Emphasis in original.) Self-determination as a means for creating new states grew from Articles 1 and 55 of the UN Charter and indeed the right to self-determination has taken on a role as an important obligation. However outside of decolonization, succession via self-determination has been very controversial.<sup>51</sup>

Which leads to the question of how does a State become a state? Essentially there are two theories. The declaratory view which essentially states that all a State has to do is declare its existence or independence and the constitute view which requires recognition from the broader international community for a State to be a state.<sup>52</sup> Crawford argues that

“substantial state practice supports the declaratory view. Unrecognized states are quite commonly the object of international claims by the very states refusing recognition. An example is Israel, long held accountable under international humanitarian and human rights law by certain Arab states that persistently deny it recognition.”<sup>53</sup>

The constitute view is less accepted but Lauterpacht defended this position as being a sort of ‘gatekeeping’ method for protecting the status of the international community of states. Others have argued that UN Membership provides a sort of collective recognition, although as Crawford points out under Article 4 of the UN Charter statehood is a criterion for membership of the UN.<sup>54</sup> However, Craven argues that “since international law is fundamentally relational, the ‘theoretical’ existence of the State remains precisely that – theoretical – until placed in a social context, and recognition thus marks the commencement of the State for practical purposes.”<sup>55</sup> Craven also points out a difference between willingness to recognize a state and a government, using the example of Taliban controlled Afghanistan, while only

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49 James Crawford, *Brownlie’s Principles of Public International Law* (8th edn, Oxford University Press, 2012), 134, 136-141

50 *Ibid*, 141

51 *Ibid*, 141

52 *Ibid*, 143-145

53 *Ibid*, 145

54 *Ibid*, 145-146

55 Matthew Craven, ‘Statehood, Self-Determination, and Recognition’ in Malcolm D Evans (eds) *International Law* (4th edn. Oxford University Press 2014), 237

3 States recognized the Taliban as the government of Afghanistan no one questioned the existence of Afghanistan as a state.<sup>56</sup>

### **States in Space?**

The single biggest legal obstacle to the creation of states in outer space, on the Moon or other celestial body is the non-appropriation principle codified in Article II of the Outer Space Treaty. Article II of the Outer Space Treaty presents several problems, first is to the establishment of any settlement itself but also to the establishment of a state. Article II of the Outer Space Treaty prohibits the 'national appropriation' of outer space, the Moon, or any other celestial body by claims of sovereignty, use, occupation, or any other means. While there is certainly much debate about what that means, there is general agreement that it is a broad prohibition on the acquisition of territory in outer space. However, what that means with regards to inhabitants is an open question.

It is also important to remember that Article I of the Outer Space Treaty says that outer space, the Moon, and other celestial bodies are free for exploration and use by all States. However, that is not without conditions, most notably the non-appropriation principle expressed in Article II of the Outer Space Treaty. Furthermore, the preamble of the Outer Space Treaty takes an optimistic tone about the future of humanity in outer space, indeed it opens by saying that the States Parties to the Treaty are "inspired by the great prospects opening up before mankind as a result of man's entry into outer space..." It can therefore be argued that Article II is not a barrier to 'settlement' and development of outer space, indeed this is what Blount and Robinson argue saying that Article II is broad and hard to define, even if taking a 'plain ordinary meaning' approach to interpretation. They argue that this was a deliberate choice on the part of the drafters of the Outer Space treaty and that Article II

"should be read as anti-imperial or anti-colonial, which represents a common ground between Soviet communism and liberalism in the American tradition. Article II is carefully worded to exclude imperial logics from extending into space, while avoiding ideological differences."<sup>57</sup>

Additionally, they argue that Articles I and XII of the Outer Space Treaty indicate that the "drafters contemplated the possibility of occupation in terms

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<sup>56</sup> *Ibid*, 239

<sup>57</sup> PJ Blount and Christian J Robison (2016) One Small Step: The Impact of the U.S. Commercial Space Launch Competitiveness Act of 2015 on the Exploitation of Resources in Outer Space' 18 North Carolina Journal of Law and Technology 2, 160, 163-164

of inhabitation.”<sup>58</sup> And that the intention of the wording of Article II OST was to deter and prevent a colonial land grab, as had happened in Africa during the later half of the 19<sup>th</sup> century but not to deter the development, exploration and settlement of outer space.<sup>59</sup>

Indeed, there is a potential solution within the existing space law regime and that is use of the ‘space object’ concept. As with a number of concepts in space law the concept of ‘space object’ is not well defined. There is no official definition though practice has established that “space objects may be defined as artificial man made objects that are brought into space and are designed for use in outer space.”<sup>60</sup> The space law treaties strongly imply that a space object is something that is launched into outer space<sup>61</sup> although Article VIII of the Outer Space Treaty does, as mentioned, state that “ownership of objects launched into outer space, including objects landed *or constructed on a celestial body...*” (authors emphasis) is not changed based on their location which gives scope for facilities constructed on the Moon or Mars or any other celestial body to be considered ‘space objects’ even if they have not been ‘launched.’ This is further supported by the fact that Article XII of the Outer Space Treaty clearly envisions the establishments of bases or outposts if not ‘settlements’ *per se* by referring to “stations” and “installations” “on the Moon and other celestial bodies.”

One of the potential ‘loopholes’ with regards to Article II of the Outer Space Treaty is to not claim territory but to ‘use’ it. Article I of the Outer Space Treaty provides for the freedom to ‘use’ outer space and establishing bases and installations is clearly permitted by the treaties, or else Article XII of the Outer Space Treaty would be pointless. Furthermore, states retain ownership and control over their space objects (and liability for them) even if they have been ‘abandoned’, so the descent stage of the Apollo 11 Lunar Module still belongs to the United States government, for example. This particularly works as any settlement or outpost on a celestial body will need to be contained within pressured modules like the International Space Station, even if resting on the surface or under the surface of Mars. Therefore, it is potentially possible for a Mars city to be considered a ‘space object’ or a constellation of ‘space objects’ and for the space object to constitute the ‘territory’ or ‘area’ of the settlement with no claim being made to the actual ‘land’ that it sits on or under. This ‘station’, ‘installation’ or ‘settlement’ could utilize the provision calling for the avoidance of ‘potentially harmful interference with the activities of other States Parties’ in Article IX of the

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58 *Ibid*, 165

59 *Ibid*, 165-166

60 Stephan 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), 32

61 Outer Space Treaty Articles VII and VIII; Registration Convention Article II(1)

Outer Space Treaty instead of reliance on the exclusionary nature that is inherent in property over territory<sup>62</sup> and which would by its very nature be a violation of Article II of the Outer Space Treaty. There are potentially terrestrial analogues that could be useful in this regard, most notably is the Antarctic research base, which while not existing in a regime that prohibits ‘national appropriation’ nor the exercises of State sovereignty do exist within a regime that freezes any claims to territory.

The International Space Station itself is potentially a good model to use for a governance regime, through the International Space Station humanity has been able to maintain a ‘permanent’ human presence in low Earth orbit for nearly 18 years. The International Space States is not, legally speaking, regarded as one ‘space object’ but a collection of individual space object, the partners who supplied the modules retain jurisdiction and control over their individual modules and indeed in the US section of the space station it is American law which prevails and in the Russian section, Russian law. However, there another dimension to this as states retain ‘jurisdiction’ over their nationals in outer space, so an American in the Russian section can still be subject to American law.<sup>63</sup> This is why a specific agreement was drafted. Article 22 deals specifically with the issue of criminal jurisdiction but it is not overly clear as to the process<sup>64</sup> and as, thankfully, it has never been tested there has been no need to clarify it. That said the issue of overlapping jurisdiction is a potential problem for any space ‘station’, ‘installation’ or ‘settlement’, and criminal jurisdiction in space is a significant overlooked issue. Of course, extraterritoriality is not exactly a new problem and it may be that something like the extraterritorial courts of the European empires of the 19<sup>th</sup> and 20<sup>th</sup> centuries may furnish a solution, however, given the ties of that idea to European imperialism there may be those, for example China, who object to such a solution on those grounds.

As for creating a new state in space, there are several issues. Can a ‘space object’ constitute territory? There, unsurprisingly, is not a huge amount of precedent or example to draw upon with regards to artificial constructs constituting territory as required for the establishment of statehood, perhaps the ‘best’ is the example of Sealand, although that does not provide much

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62 Kevin Gray and Susan Francis Gray, *Land Law* (7th edn, Oxford University Press 2011), 48-49

63 Christopher J. Newman, ‘Exploring the Problems of Criminal Justice in Space’ (2016) 2(8) *Room* <<https://room.eu.com/article/exploring-the-problems-of-criminal-justice-in-space>> 13 May 2018

64 Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of American Concerning Cooperation on the Civil International Space Station (adopted 29 January 1998, entered into force 29 January 1998) TIAS 12927 (ISS Agreement)



hope for would be space states.<sup>65</sup> Beyond that there is the question of whether the non-appropriation principle only applies to terrestrial states? There is a good argument that it does given the general convention that new states have to except existing international customary law and the general agreement that the non-appropriation principle is international customary law<sup>66</sup> but there are the arguments listed above that the Outer Space Treaty was only supposed to prevent terrestrial States from annexing territory in space not the establishment of new states in space. Of course, whether a settlement on the Moon, Mars or other celestial body needs to be a 'state' in order to be successful and viable is another question... Population is perhaps less of an issue, although this will require a difference between an 'outpost' like the International Space Station and an actual settlement. There are open questions as to whether a colony is actually possible, little research has been conducted about the viability of procreation in outer space which could be a 'showstopper. Effective government is likely to be less of an issue as the harsh realities of life in space will necessitate an effective government in order to simply survive.

### Other Considerations

Beyond considerations of the status of the settlers, colonists or inhabitants of space settlements, colonies or outputs and how they fit within the existing framework of international space law, and how the legal process of state creation may work in the novel environment of outer space, particularly without overturning the existing legal regime, there are several other governance considerations. Such as what form should a settlement government take? And should things like water and air production be public utilities held in common or for the public good or should they be allowed to be operated by private concerns? Does the nature of society itself need to change and there need to be a recognition that there needs to be a more communal, integrated approach given the hostile nature of the space environment? Some of these issues will be best left for the consideration of the colonists themselves, others are questions humans have been trying to address since the dawn of civilization. As with the other questions, it is worth initiating the discussion now, while there is time to explore some of the more nuanced or esoteric aspects of these issues. Settlers on the frontier generally do not spend time discussing the nature of the state. While this can be viewed

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65 Laurence Cawley, 'The Off-shore Fort 'State' of Sealand Marks 50 Years' (*BBC News* 2 September 2017) <<http://www.bbc.co.uk/news/uk-england-suffolk-41135081>> accessed 13 May 2018

66 Francis Lyall and Paul B. Larsen *Space Law: A Treatise* (Ashgate 2009), 54; Steven Freeland and Ram Jakhu 'Article II' in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law*, vol 1 (1st edn, Carl Heymanns Verlag, 2009), 46-47

as an opportunity to experiment with new models and idea it also must be recognized that States develop organically from the social and cultural environment from which they arise.<sup>67</sup>

### **Final Thoughts**

Humans living and working in space is already a reality and it is one that is only likely to grow more 'real' as time goes on. While some of the concepts currently being advanced may be overly ambitious or downright fantasy the transformation of the space sector over the last 70 years clearly shows that no matter how long it may actually take we will get there someday. Flight itself, let alone travel to the Moon was only just over a century ago considered fantasy. However, one thing that is clear is that there are many legal and governance issues that need to be addressed before we can start building societies or even nations in outer space. This is particularly important for the maintenance of the rule of law in outer space. Those voices calling for the ditching of the existing space law regime so that they may get on with the job of building a 'spacefaring civilization' unencumbered by 'terrestrial' rules and regulations are growing louder. It behoves the space law community to answer those voices before space descends into a Hobbesian 'state of nature.' One does not need to be well versed in the horrors of European imperialism to understand the dangers that lie in an unfettered free for all in territory and resources. Space is a valuable, precious, and fragile gift for the future of humanity. Space lawyers need to remember the words of Andrew Haley, written at the dawn of the space age that "...as the future beckons man into outer space, man must look there too for the rule of law. If he does not, the consequences may be fatal: 'A world without law is hell-bent for destruction with or without scientific discoveries.'"<sup>68</sup>

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67 Ganesh Sitaraman, *The Counterinsurgent's Constitution: Law in the Age of Small Wars* (Oxford University Press, 2013), 148

68 Andrew Haley, *Space Law and Government* (Appleton-Century-Crofts: 1963), 15