

# The limits of law: challenges to the global governance of space activities

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## Abstract

The development of space-related technology since the dawn of the 'space age' in 1957 has given rise to many new and exciting possibilities. Humankind is now seeking to embark on a broad range of space activities and the utilization of this technology forms an integral element of the global society, such that the world is dependent upon constant and unimpeded 'access' to space. Yet, the existing international legal and governance framework, largely developed in a very different era of space activities (1960s–1980s), is now under strain to provide the necessary certainty, standards and protections to appropriately address specific uses of space that have emerged due to recently evolving space technologies. This gives rise to a number of significant challenges for the ongoing global governance of the use and exploration of outer space and, in particular, humankind's interaction with, and dependency on space-related technology. Important questions arise as to how to address these challenges in a way that will enable humankind to continue to use space for peaceful purposes and to garner significant benefits through such use for the benefit of the global society. This article highlights some of the major challenges that arise and outlines important factors that must be considered in developing appropriate legal, regulatory and policy frameworks for future space activities, so as best to serve the interests of current and future generations.

## The complexity and ubiquity of space

On 4 October 1957, a Soviet space object, Sputnik I, was launched and subsequently orbited the earth over 1,400 times during the following three-month period. This milestone heralded the dawn of the space age, the space race (initially between the Soviet Union and the United States), and the legal regulation of the exploration and use of outer space.<sup>1</sup>

Since then, some fundamental international legal principles have developed that significantly improve the standard of living for all humanity through, for example, the facilitation of public services such as satellite telecommunications, global positioning systems, remote sensing technology for weather forecasting and disaster management, and television broadcast from satellites, coupled with many additional uses of space that are, and will be possible through

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the advent of the miniaturization of satellites.<sup>2</sup>

Furthermore, the scientific and exploratory nature of many space activities further enhances our knowledge of the universe in which we live, as well as the origins of the Earth and of humankind. We are now also looking at the prospect of establishing human settlements in space and further utilising and exploiting the natural resources of space that might ultimately be accessible to us.

Space is vital in terms of the world economy, strategic thinking, terrestrial military strategy, geopolitics, human rights, commercial enterprise, technological innovation and, frankly, the future of humankind. The impact of our use of space and the increasing range of space activities mean that law does and should have an important role to play in ensuring that such activities are carried out in an appropriate manner, with appropriate outcomes and benefits and for appropriate purposes. Moreover, the avoidance of a “tragedy of the commons” scenario<sup>3</sup> is crucial if humankind is to garner the maximum benefit from what space can offer.

Clearly, therefore, the prospects for the future use of outer space offer both tremendous opportunities and challenges for humankind, and law at both the international and national levels will continue to play a crucial part in this regard. It is in this context that this article sets out to briefly outline some of the various challenges ahead for legal regulation in this sphere.

### Legal challenges posed by the development of space technology

Given the rapid advance of technology in so many spheres and the clear reality that, in many respects, the world is becoming “smaller” and increasingly “internationalized,” there is an imperative to explore the fundamental design elements of supranational legal governance for issues of global concern — for example, the impacts of climate change, world poverty, the global commons and international criminal justice<sup>4</sup> — whilst also retaining a grounded view of their significant practical contemporary relevance.

Since the exploration and use of outer space is so impactful on this ongoing evolution, leading as it does to so many changes in the way that individuals, communities, cities, nations and the world operate and exist, this is equally the case when it comes to the regulatory and policy frameworks for space activities. The sheer pace of change and the broadening of potential activities in outer space dictates that we need to continually monitor the scope and content of this framework, whilst at the same time recognising that, at least from a strictly legal regulatory perspective, it will not (ever) be possible for the law to keep up with these changes.

This is highlighted, for example, by the interaction between space technology and another area of great relevance to future global/international regulation: that of cyber law and cyber security. It is important to recognize that the important issues that arise from the continuing development of

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<sup>2</sup> See Freeland (2019).

<sup>3</sup> See Hardin (1968). For a discussion of the implications of the tragedy of the commons to the use of outer space, see Freeland (2017a).

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<sup>4</sup> For an example of the interplay between the use of space technology and the promotion of international criminal justice, see Freeland & Jakhu (2018).

cyber technology are increasingly relevant for the regulation of outer space, given the increasing rush towards a “digitization” of space activities. Just as there have been past lessons for space law in considering the legal regime established for air space, so it is important for the future development of space law to understand the complexities — from a jurisdictional, technical, commercial, societal, cultural and security-related perspective — that arise with respect to the use and regulation of cyber space.

There are clear parallels between the two regimes of outer space and cyber space, not only in considerations impacting on the law-making side, but also due to the seemingly endless development of technology that results in the activities of these two realms becoming ever more interdependent. In many respects, they act together in the one ecosystem, each reliant on the other for their respective efficient functioning, development and ongoing operational viability, not to mention the important associated national security considerations.

Indeed, it is increasingly necessary to design space infrastructure with a clear reference to the cyber-related elements associated with the implementation, utilization and application of that infrastructure. In this regard, it is somewhat curious that, in quite a number of countries, Governments have devoted considerable resources towards the establishment of systems designed to protect the cyber capability and operations of that country, but have not perhaps been as cognizant to devise similar protective systems for their space assets.

Instead, a different mantra — one involving the call for defensive space weapons — seems to have been accepted as the most appropriate (and in some cases, only)

way in which to protect important space infrastructure. A closer consideration of the interplay between cyber capability and space operations is an equally (and perhaps more compelling) strategy to work out appropriate national security measures to minimize the possibility that space assets might be compromised by the actions of other States.

Bearing in mind the rapid development of space-related technology, and the legal challenges that this represents, it is pertinent to reflect on the fact that, in 2017, we celebrated the 50<sup>th</sup> anniversary<sup>5</sup> of the first — and most significant — of the United Nations space treaties, which is usually referred to as the Outer Space Treaty.<sup>6</sup> During that celebratory year, this author was invited to give a number of keynote speeches at various events to commemorate that important event. In the course of preparing for those speeches, this author had cause to look at an important collection of essays entitled *Outlook on Space Law over the Next 30 Years*, which was published on the occasion of the 30<sup>th</sup> anniversary of the Outer Space Treaty in 1997.<sup>7</sup>

It is interesting but perhaps not surprising that, barely two-thirds of the way through the second 30-year period following the finalization of the treaty, virtually all of the “possible”/“maybe”/“perhaps” innovations in space canvassed in that book are already a reality or near reality, with some of

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5 The year 2017 was, of course, also another significant anniversary year — the 60<sup>th</sup> anniversary of the Sputnik 1 mission.

6 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (Outer Space Treaty) 610 UNTS 205.

7 Crowther (1997).

them now part of mainstream space activities.

Another interesting observation is that — again not surprisingly — that book centres around the Outer Space Treaty and the traditional actors involved in space activities. Whilst, of course, both the treaty and the existing space participants will continue to be very significant in the future regulation of space, it is incumbent on us all to take a “holistic” view of how space inter-relates with every aspect of life and what this means in terms of constructing the most appropriate legal and regulatory frameworks going forward.

Indeed, the dream of space, and the desire of humankind to engage with space in more and more ways, has driven the development of space-related technology far more quickly, and in ways that would not have seemed imaginable even a few years ago. And, as typifies much about the development of legal rules in a sphere driven by technological innovation, space law has not, as noted above, kept pace with the multitude of space activities about which we can now marvel, and therefore there might increasingly arise various concerns and uncertainties as to how best address the vast complexities that specific uses of space may give rise to.

Nor, in this author’s opinion, *should* law purport to keep pace with this technological change with respect to space, given that the developments are so rapid and fluid. Today’s technology is often quite quickly rendered obsolete (or at least insufficient) in tomorrow’s world. To assert, therefore, that the legal framework is completely up-to-date in every way is therefore misleading and may even lead to complacency. Conversely, to attempt to provide for every conceivable future development might amount to seek-

ing to regulate for the “unknown,” which brings with it another set of inherent risks.<sup>8</sup>

Rather, the most appropriate methodology for addressing these changes is to understand the direction that they are taking and to introduce frameworks with a sufficient degree of flexibility, so as to allow the broader principles to remain applicable to new activities even if the express regulatory provisions for specific “new” space activities are not always comprehensively articulated.

This indeed mirrors the “success” to date of the fundamental principles of space law expressed in the Outer Space Treaty. These remain highly relevant and foundational — perhaps even more so than ever — these five decades later notwithstanding that we are now in a very different space “world.” In this author’s opinion, those who express the view that the fundamental principles of international space law are somehow outmoded or irrelevant are, in reality, frustrated that they are an “inconvenient” restriction to certain military uses of outer space that violate the essence of the way we are to operate in space. Such views are misguided and demonstrate a lack of understanding of the complex history and geopolitical environment underpinning the development of international space law, as well as the object and purpose of the United Nations space treaties.

The evolution of space activities since the days of Sputnik 1 — and the associated laws and guidelines that regulate those activities — has seen a transformation from an era where, initially, only two States dominated the scene, to one where there are a growing number of space-faring States

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<sup>8</sup> See Freeland (2017b).

(currently estimated to be around 60–70).<sup>9</sup> This, coupled with the exponential growth of commercial opportunities, has historically seen primarily large and well-funded companies invest heavily in space technology, with a view to reaping significant economic returns.

The beginning of the 1990s saw the commercialization of space really start to expand rapidly. By 1998, the spend on commercial space had caught up to Governmental space expenditure and, whilst both have grown rapidly since then, the commercial sector now significantly exceeds the non-commercial space sector in terms of investment. In overall terms, it has been estimated that the total value of the global commercial space “industry” in 2018 was approximately US\$385 billion (representing an annualized growth rate of 7% since 2005), and that this figure is anticipated to grow exponentially to somewhere between US\$1–3 trillion by 2040.<sup>10</sup> Whatever the correct upper amount, it is clear that the commercialization of outer space is a powerful factor and a major growth area, rising at a much faster rate than the overall global economy.

The enticement of such significant growth, together with the development of technology that enables and facilitates new and potentially lucrative opportunities in space, appear to be an attractive proposition not only for the established space-related companies, but also for a new breed of space

entrepreneurs and smaller (and perhaps nimbler) space entities.

Much has been written about this trend towards the commercialization and privatization of space, and the increasingly important role that non-governmental actors play, not only to serve the needs and demands of civil and commercial end users, but also those of States and even military customers. These trends will, if anything, continue at an increasing scale given the trend towards the “democratization” of space as new actors emerge due to developing technology. This will, undoubtedly, present considerable additional challenges to the overarching ‘global commons’ legal characterization of space, and the principle of freedom of use of space,<sup>11</sup> that stem from the fundamental roots of space law.<sup>12</sup>

Innovations such as nano/small satellite technology and human aerospace flight will, ultimately, bring “space to more people” in a tangible way: through direct participation and entrepreneurship. This is very important since, perhaps not surprisingly, those involved in the space regulatory “industry” have not “sold” the idea of space, and its significance to the general public, very effectively at all in the past.

As an example, just a few short years ago, this author picked up a copy of the *Wall*

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9 Of course, viewed from another perspective, this also means that approximately two-thirds of the world’s countries do not have any indigenous space capability whatsoever, placing them at an increasing comparative disadvantage over time and rendering them entirely dependent on others for access to space infrastructure. Obviously, this gives rise to sovereignty and national security concerns for those States.

10 See Higginbotham (2018).

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11 Article I of the Outer Space Treaty provides in part as follows: “... Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies. There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.”

12 See Freeland (2017c).

*Street Journal* whilst in Canada and was surprised and initially delighted to see that the front page had an article about space law. He was quickly brought down to Earth, so to speak, by the headline — “If a Martian Wrecks Your Rocket Ship, Who is Liable?”<sup>13</sup> Is this really what people think about the scope and importance of space law? Despite everything that space-related technology can and does do to raise the standard of living for the entirety of global humanity, is this the best that can be said about the laws that make this possible?

It seems quite extraordinary in this day and age that one great challenge for space law has often been is to get people to actually take it seriously. Those of us who have discussed with our respective Governments the need to establish rational, practical and appropriate legal and regulatory frameworks for the development of a viable space industry at the national level have in the past sometimes been met with counter-arguments stemming from inertia and conservatism, financial concerns, differing priorities and, unfortunately, a lack of understanding.

This situation has now changed somewhat — although not universally — and the truth of the matter is that space is, of course, very real and not something to be derided or ignored, but rather a vital element for the very future of our life here on Earth (and perhaps beyond). No country can afford to fall behind its friends and neighbours in relation to important aspects of its space development.

As noted, space impacts on every country and must be embraced in the most appropriate way for each nation, irrespective of

its economic, political or industrial circumstances. In short, no longer is space a “luxury” just for the space “haves:” it is now an imperative for all countries and represents an essential part of their vital infrastructure. Appropriate “rules of the road” are therefore necessary and the challenge is to ensure that these provide the best possible way forward in the circumstances of an ever-changing technological environment.

### How to address the major legal challenges

In view of this evolving situation, each country is, or should be, asking the same questions: what does the development of space technology mean for us? How can we maximise our ability to take advantage of the use of space for our continuous development? Do existing national laws or policies unduly inhibit or restrict the development of a viable and self-sustaining domestic space “industry,” or can they be categorized as “enabling”? What regulatory framework is most appropriate for us in terms of our risk profile, capability, needs, culture, economic circumstances, national security situation and strategic alliances? How can this framework be constructed in a way that is adequately “future proofed” (if indeed this is at all possible)?

The answers for each country will be different, but there is no mistaking the need to address the implications of our ongoing development of space-related technology. They pose great opportunities but their management and regulation — both at the international but, even more significantly, the national levels — raise difficult questions for all decision makers and for the creation of legal frameworks.

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<sup>13</sup> Hope (2015).

As such, we are standing at the dawn of a new era in space activities, which will require very considerable thought as to exactly *how* to adapt, and adopt, appropriate legal frameworks that are able to strike the most appropriate balance between sometimes competing interests. There is an urgent need to comprehensively assess these challenges and to develop and design the structure and content of these frameworks.

In order to be relevant, innovative and sufficiently “forward-thinking” to properly advance the field of space law, the development of these frameworks to meet the challenges of the 21<sup>st</sup> century must incorporate a comprehensive approach, breaking down the “silo” mentality that has traditionally characterized not only existing legal research, but also the current space “law-making” and regulatory processes.

In essence, the challenge — indeed the imperative — is to develop legal and regulatory frameworks to properly address the demands and inevitability of technological innovation and an increasingly globalized and connected world, not the other way around.

This represents an enticing opportunity for space lawyers to play an even greater role in the context of the so-called “NewSpace” phenomenon, by engaging more actively with new participants in space and therefore advocating for appropriately balanced enabling laws and legislation to allow for the most progressive path forward. It is not the time for detached and overly academic law-making, rather the future space law regimes must be closely integrated with and aligned to the sheer breadth of influence and impact that space technology does and will assume.

There are other examples of legal challenges ahead for space law. In order to sys-

tematically approach these challenges, we must first understand the issues that they give rise to: only then are we in a position to construct, through a cooperative and multi-disciplinary approach, the laws and standards that will allow humankind to maximise the benefits to be garnered from the exploration and use of outer space. The position is so fast-moving and fluid, given the speed at which innovation and technology develop, that it is neither possible nor appropriate to any longer attempt to rely *exclusively* on the traditional principles — as important as they will remain — that are to be found in the United Nations space treaties.

Nor can we then rely on a simple “copy/paste” transposition of terrestrial international law principles to somehow fill the gaps in the extra-terrestrial regulation of activities that are clearly beyond the contemplation of the original drafters of the United Nations space treaties. This author has listened with interest to commentators who latch on to article III of the Outer Space Treaty<sup>14</sup> — which provides that activities in outer space shall be carried on in accordance with international law — and who then make a quantum leap to their “eureka” moment, to postulate that laws that were developed on Earth for terrestrial activities can somehow magically fit into the unique environment that is outer space. This is a seductive conclusion, but, in this author’s opinion, far too simplistic to adequately

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14 Article III of the Outer Space Treaty provides as follows: “States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.”

meet the realities. Square pegs do not seamlessly fit into round holes.

With respect to perhaps two of the most pressing challenges for space law — the long-term sustainability of space, and the potential militarization/weaponization of space — the existing terrestrial environmental principles on the one hand,<sup>15</sup> and the laws of armed conflict on the other,<sup>16</sup> whilst relevant, are certainly not adequate or necessarily appropriate in various respects to meet the complexities that these issues present. Both of these pressing questions require specifically crafted legal rules that, even if they do draw on terrestrial law for some inspiration or comparison, are specifically designed to meet the peculiarities that stem from our legal characterization of outer space, as well as the complex non-legal factors that impact and shape the broad range of space activities.

The attempts to deal with these challenges thus far have largely been exploratory, generalized, and on a non-binding and voluntary basis. Whilst much has been made of the importance of “soft law” instruments<sup>17</sup> in shaping the face of the space regulatory regime, this author has reservations as to whether such an approach serves us well in the longer term, particularly in relation to such important issues in the context of our future uses of outer space and, indeed, in many respects, for the future survival of the human race.<sup>18</sup>

Notwithstanding the legal “value” that some such instruments may have, at their

core they are merely guidelines or recommendations that do not necessarily have the force of law, unless they are to be regarded as reflecting rules of customary international law, itself a very difficult assertion to substantiate in the absence of, say, a finding to that effect by the International Court of Justice.<sup>19</sup>

Given our increasing reliance on such non-binding measures in a whole range of space-related matters, do we run the risk that they will work only until they don't? Shouldn't they always be regarded only as interim measures, until traditional international law principles can be agreed and applied? And, indeed, is this approach feasible given the multitude of concerns associated with the continued development of space-related weapons technology, and the environmental (and other) risks that they pose?

Ideally, binding treaty norms should be negotiated, to be adhered to in good faith by all relevant States. Of course, in the absence of a change of approach between, in particular, the major space powers, treaty rules are unlikely to come to fruition in respect of these issues in the short and perhaps medium term. Instead, so-called non-binding Transparency and Confidence Building Measures (TCBMs) are articulated as the way forward and are expressed to be stepping-stones towards a more formally binding agreement. The risk is, of course, that

15 See, for example, Boyle (2013); Bohlmann & Freeland (2013); Freeland & Lawler (2011).

16 See, for example, Freeland & Gruttner (2020).

17 Marboe (2012).

18 Freeland (2011).

19 See a whole range of decisions at the International Court of Justice on the issue of how to establish the existence of a rule of customary international law, beginning with the *North Sea Continental Shelf Cases* (Federal Republic of Germany v. Denmark and Federal Republic of Germany v. The Netherlands) (Judgment) [1969] ICJ Rep 3. See also Jakhu, Freeland & Chen (2018).

these binding arrangements never actually eventuate.

This recourse to TCBMs may well represent a realistic assessment with respect to the difficulties in achieving a significant degree of mutual cooperation and the requisite degree of political (good)will to resolve any impasse in a more comprehensive way but, in this author's opinion, in the end, binding norms that also fashion and regulate responsible behaviour by those engaged in space activities will be crucial.

This represents a major challenge ahead for all who understand the role of law in facilitating the peaceful and sustainable uses of outer space in the future. But it is a goal towards which we must all strive: the fact that we do not have such a comprehensive treaty regime in relation to military uses of outer space as yet does not mean it cannot happen. In the meantime, academia, industry and other experts are engaged in research that seek to articulate, at least in the view of those involved, what they perceive to be the *lex lata* rules relating to the military uses of outer space.<sup>20</sup> These are useful exercises although they can never, of course, represent a binding document to which States must comply for fear of be subject to sanctions under the principles of general international law.

### Other significant legal challenges

Apart from the two major challenges to space law in the future that have been referred to above, there are a number of

other significant issues that will require careful consideration as to their ongoing regulation. This section poses some questions that arise in respect of each of these, each of which will be relevant for future lawmakers and policy designers.

This article has already made reference to the increasing use of small, nano and micro satellites. This technology may represent an important precursor to the establishment of indigenous and independent space programs in States that previously could not have contemplated undertaking such activities. By eliminating some significant barriers to entry, small satellite technology may facilitate capacity building, broader collaborative opportunities, and education/training programs, as well as bridging (some) technology gaps for hitherto non-space faring States. It will also open up even more diverse commercial opportunities for a much broader range of potential service providers.

It is perhaps appropriate to liken the potential of small satellites for space activities to the way that mobile phones have revolutionized terrestrial communications activities. We simply do not know where this technology might ultimately lead and what it will allow us to do. However, we can confidently expect that it will open the door to an even more expansive array of commercial opportunities.

This inevitably represents some significant challenges to space law. For example, what is the impact of this technology for the space "market"? What forms of legal and regulatory frameworks are necessary to balance the interests of a particular State with the demands of entrepreneurs? How will existing space actors react to the potentially new range of participants that this technol-

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<sup>20</sup> See, for example, the work undertaken in the 3-year project entitled *Manual on International Law Applicable to Military Uses of Outer Space* (MILAMOS), a research project led by McGill University in Canada, and involving experts from 22 countries of the world: available at <https://www.mcgill.ca/milamos/> (accessed 30 March 2020).

ogy will allow for? Should the governing legal regime encourage or discourage this evolution towards a multitude of space actors? What role does/should law have in facilitating the commercial possibilities offered by low-cost satellites? How do we deal with the prospect of so-called “mega-constellations” of small satellites, whose (planned) number will quite quickly dwarf the number of space objects launched in the six decades from the time of Sputnik 1?<sup>21</sup>

As noted earlier, there has developed an important cross-fertilization of activities in outer space with those in cyber space. In this regard, it is no surprise that many of the major digital platform companies have now expressed significant interest, and invested large sums of money, towards an incorporation/expansion of their existing operations with additional space activities. This is sometimes referred to as the “GAFTA phenomenon” (Google, Amazon, Facebook, Twitter, Apple).

How should the recent interest shown by major digital platform operators be regulated in the space sector? Will there be a major convergence between digital content and the space industry? How can/should law react to, and properly regulate this rush towards the digitization of commercial space?

Another challenge that arises is the development of aerospace technology and the legal regulation of human aerospace and space flight. Much discussion is required about the future legal regulation of these activities and, equally importantly, about

who would take responsibility — and how — for the governance structures and legal principles that will be needed.<sup>22</sup> In this regard, one will need to examine the scope and legal/regulatory implications of, for example, proposals to (re)define the areas of air space and outer space into distinct zones corresponding to differing uses of space-related and high-altitude technology (drones, balloons, other high-altitude platforms, air travel, aerospace flights, sub-orbital flights, orbital flights, space stations, permanent human settlements etc)?

In the area of geo-politics, strategic space, and transparency and confidence building measures (TCBMs), must we really be required to think of space in terms of that now well-worn mantra — that it is “contested, congested and competitive” — or is there another theme(s) towards which future space law should be directed?<sup>23</sup> How can the regulatory framework minimise/mitigate the threat of conflict involving the space ambitions of States? How can we ensure that *all* ‘voices’ relating to space are heard, not just those that loudly advocate for its designation as a “war fighting domain”? In this author’s opinion, such calls are dangerously self-fulfilling and largely self-defeating: all States, particularly the major space-faring ones, will suffer if activities in space are undertaken in such an irresponsible manner as to cross certain “red lines” of accepted behaviour.<sup>24</sup>

And, of course, no overview of the challenges facing space law would be complete without a consideration of the potential for the commercial exploitation of the natural

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21 In this regard, one of the major private entities engaged in proposals to launch many hundreds of small satellites has recently announced significant funding problems that will, at least in the short-medium term, most likely curb its activities somewhat; see Amos (2020).

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22 See Freeland (2010).

23 See Freeland (2018a).

24 See Freeland (2018b).

resources of outer space. As is well known, the United States Congress passed the Space Resource Exploration and Utilization Act of 2015. Shortly afterwards, Luxembourg enacted its own national legislative framework<sup>25</sup> that encourages and promotes space resource exploitation and utilization. It seems apparent that other States, such as the UAE,<sup>26</sup> may also follow on this path.

These national law developments have highlighted some thorny legal issues but have also brought to the forefront intense geopolitical disagreement at the United Nations discussion level.<sup>27</sup> Even putting those aside, how will technology ultimately enable this commercial exploitation to take place? Is there a potential legal/regulatory model that will adequately support these activities, particularly in light of the uncertainties that some express with respect to the interpretation of the relevant principles of the treaty regime?<sup>28</sup>

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25 See <https://spaceresources.public.lu/en.html> (accessed 30 March 2020).

26 See UAE Space Law Details Announced to Facilitate Space Sector Development, <https://spacewatch.global/2020/02/uae-space-law-details-announced-to-facilitate-space-sector-development/> (accessed 2 April 2020).

27 A current (since 2017) item on the agenda of the Legal Sub-Committee (LSC) of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is “General exchange of views on potential legal models for activities in exploration, exploitation and utilization of space resources.” In addition, in June 2019, UNCOPUOS Member States agreed to convene “scheduled informal discussions” of the exploration, exploitation and utilization of space resources, which were convened for the 2020 LSC session — this has been cancelled due to the current coronavirus situation and most likely will commence in 2021.

28 See, for example, Article II of the Outer Space Treaty, which provides: “Outer space, including the Moon and other celestial bodies, is not subject to

These are but a few of the imposing challenges ahead for space law. The existing regulatory regime has largely served us well and, in many respects, has been remarkably successful. But the “spacescape” is changing very quickly, driven by this bewildering technological maelstrom that, over the last five years or so (and certainly for the next period of time), has far surpassed the already rapid evolution in space-related technology that began at the beginning of the space race.

### **Two important “takeaways:” principles of humanity and stewardship**

We thus find ourselves in “interesting times.” The need for a more comprehensive and detailed legal/regulatory framework for outer space represents one of the most politicized and complex challenges ahead for our, and future generations. All stakeholders need to work together to find a path forward, in order to meet the challenges. The existing international regulatory framework, whilst important, cannot alone stand up to the complexities that the ever-increasing range of space activities — and the possibilities that still lie before us — impose.

The opportunity presents for Governments, industry, scientists, entrepreneurs and civil society to work together to develop appropriate future legal frameworks that supplement and compliment the robust foundational principles that underpin how space has “worked.”

This leads to probably the two most important considerations this author can offer. How should the societal, community and human impacts of our inexorable march into space be measured? Why has there been so little work done so far as regards

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national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”

the human rights aspects of the exploration and use of outer space?<sup>29</sup> What legal and regulatory regimes best protect the broader interests of society without unduly restricting the development of appropriate space activities in the future? And, indeed, what are the criteria by which we are to determine the priorities as to what constitutes “appropriate” future space activities? What role does law play in fashioning these choices?

Furthermore, as we develop frameworks to address these legal challenges, we must always remain cognizant of the “stewardship” role we, as human beings, have in the way we manage our ongoing relationship with space. Our responsibilities in this regard extend not just to ourselves, but to future generations.<sup>30</sup> It is incumbent on us, and imperative for the future of humanity, that we do not repeat some of the mistakes we have made on Earth that threaten our ability to coexist here into the very long term.

In answering these questions, it is important that, at all times, we are conscious of, and adhere to, the core principles of “humanity” that underpin space law, in order to avoid the possibility of scenarios that do not bear contemplation. In the end, the principle of humanity must be the bedrock of all global legal regimes, including the regulation of the exploration and use of outer space.

In this regard, law will therefore continue to play a crucial role. But lawyers certainly cannot do this on their own. They simply do not have the tools to do so. All relevant stakeholders must exchange ideas, knowledge and expertise, and understand how each can contribute to an appropriate future where space continues to play a vital role in the activities of humankind. In the end, these discussions will be the most important way in which all of the exciting innovations and developments that we all dream about can best be advanced.

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29 See Marboe (2013); Freeland & Ram Jakhu (2014).

30 This obligation is already reflected in Article 4(1) of the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement) 1363 UNTS 3, to which Australia is a State Party, although it must also be noted that there are currently only 18 States Parties to this instrument, none of which are considered as “major” space powers; see Hobe et al. (2013).

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