

# Per Antitrust Ad Astra Monopolies and International Space Law

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## Abstract

Space activities rely on capital-intensive assets that benefit from deep technical expertise and from economies of scale. Because of these high barriers to entry, and because the practical operational space is ultimately limited, space actors enjoy an early mover advantage, allowing them to cement their leadership vis-a-vis others. The ensuing dynamic can create a secondary barrier of entry for prospective space operators: not only do they enjoy a more limited domain to operate in; they might also be deterred by prohibitive conditions that come with the use of necessary technology. Within market environments, this risk of displacement is typically met through competition and antitrust law. In the domain of outer space, likely due to the primacy of sovereign states as addressee of norms and the assumption of (commercial) space activities as inextricably linked with state action, there is no explicit equivalent. This text argues that the safeguards of the Outer Space Treaty and other sources of international space law contain implicit market power limitations and shows how these can be understood and applied through a treaty-native mechanism. We also suggest that the integrity of a functioning space services market is of immediate concern for emerging space nations. Ultimately, we argue that safeguarding against anti-competitive behavior is both within the spirit of international space law, required by it to a certain extent, and a critical element towards the realization of its underlying premise “access for all”.

**Keywords:** Monopoly, competition, antitrust.

## 1. Introduction

Space activities are typically resource- and capital-intensive endeavors. New actors trying to enter the domain are faced with significant barriers to entry. Often, these barriers are particularities of the frontier to be conquered. As a basic fact, moving objects into outer space requires significant energy expenditure, specialized equipment and deep technical know-how, all of which ought to be procured and financed.

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In this paper, we investigate this and a second type of barrier, that arises not out of the domain itself but of the actors within. We suggest that the activities of existing or future space actors in themselves can create a barrier to entry for subsequent space actors both on a factual and economic level. This creates risk of (ongoing) displacement of new space actors and entrenchment of dominant space service providers.

Recognizing this as a dormant risk, we consider the safeguards present, if hidden, within space law pertaining to market power limitations and suggest how market restrictions could become a desirable tool to achieve balance between rewarding innovation and promoting emerging space actors.

## **2. Space as a Gated Domain**

Access to and participation in space activities is contingent on certain capacities a potential space actor must typically possess. We shall consider the most important of these in turn.

### **2.1. Space Is Gated by Expertise**

Setting up space operations is a highly knowledge-intensive endeavor. The conceptualization, manufacturing, testing and operation of space assets are dependent on sophisticated knowledge and understanding present in each step. The necessary know-how becomes even more important when the space operation includes the transport of an asset into outer space itself.

The necessity of facilitating and maintaining expertise imposes difficulties for potential space actors. Already the aerospace-sector is considered to suffer from a shortage of qualified personnel in absolute numbers in space-faring nations.<sup>1</sup> Obtaining (actionable) expertise through talent acquisition is thus challenging for established actors already; the situation is likely more challenging still for prospective actors.

In addition, necessary know-how is often iterative; bolstered not just through simulations but tests. Gathering and processing insights requires substantial time; consider for example that SpaceX's Falcon 1 launch vehicle only successfully launched in 2008, 6 years after the founding of SpaceX and

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1 See e.g. N. Fearn, Aerospace industry grounded by lost jobs and lack of staff, 20 July 2022, <https://www.ft.com/content/93736968-8fcf-425f-b8e5-fcd9736d37f6> (accessed 08.01.2024), M. Kramer; The space industry's looming workforce problem, 12 September 2023, <https://www.axios.com/2023/09/12/space-industry-workforce-crisis>; and the joint industry report by J. Hall & Y. Akbari, On the radar: Evolving workforce and aerospace and defense firm needs, May 2023, FINAL\_PwC | AIA: Workforce Study\_051223 (aia-aerospace.org) (all accessed on 08.01.2024).

following three failed launch attempts.<sup>2</sup> Shaping institutional and personnel knowledge into project-specific actionable know-how is yet another hurdle for new actors to clear, even if they are to obtain the former.

## 2.2. Space Is Gated by Cost

Space activities are inherently costly. This is particularly true for the transport of an asset into orbit and beyond. Launch costs per kilogram of payload to orbit are typically thought of ranging between USD 10.000 to USD 25.000 (although this number is trending steeply downwards, attributed to advances in technology and private sector competition).<sup>3</sup> Correspondingly, the sticker price of space exploration efforts is often enormous, with the recent Chandrayaan-3 mission by the Indian Space Research Organisation making news by delivering a lunar lander and rover on target for *only* appr. USD 90 million.<sup>4</sup>

The inherent cost of space activities has led to a situation in which only few actors, either backstopped by an enormous corporate entity such as SpaceX or Blue Origin or funded through public funds without the (immediate) need to be profitable, can provide both launching services and development and operation of space assets at the same time.

## 2.3. The Easing of Burden Risks Unearthing Dormant Barriers to Entry

Both barriers described above exist and deter prospective space actors at the time of writing. We consider it likely that the lack of expertise is currently overshadowed by the high cost of entering into the space sector; particularly given that expertise building can be accelerated through capital expenditure (within limits), e.g. through lateral staffing of experts. However, as hinted at above, cost is decreasing steadily. Launch costs have fallen dramatically per

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2 See e.g. J. Hsu, Strike three for SpaceX's Falcon 1 rocket, 3 August 2008, <https://www.nbcnews.com/id/wbna25990806>, P. Spudis, The Tale of Falcon 1, 22 July 2012, <https://www.smithsonianmag.com/air-space-magazine/the-tale-of-falcon-1-5193845/> (both accessed on 08.01.2024). This is not to say that the project's timeline was particularly tardy compared to industry peers.

3 See e.g. the instructive visualization in H. Jones, The Recent Large Reduction in Space Launch Cost, 48th International Conference on Environmental Systems, Albuquerque, New Mexico, USA, 8-12 July 2018; and the McKinsey industry report R. Brukhardt, How will the space economy change the world?, 28 November 2022, <https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/how-will-the-space-economy-change-the-world>, (accessed on 03.01.2024).

4 See e.g. M. Sheetz, India's moon landing made history at a low cost, 23 August 2023, <https://www.cnbc.com/2023/08/23/india-chandrayaan-3-moon-landing-came-at-small-cost.html>, (accessed on 03.01.2024); the cost of the program, as often pointed out by journalists in this context, seemingly lower than certain contemporary movies "simulating" space exploration.

kilogram of payload as (few) private actors have entered the competitive arena and are forced to conform to profitability expectations.<sup>5</sup>

Similarly, space assets themselves are both cheaper to manufacture and use innovative, cost-saving designs as evidenced by the rise of mini-satellites (currently making up around 95% of launched spacecraft).<sup>6</sup> Again, competition, as well as private funding seems to depress prices overall.<sup>7</sup> Given the trend of falling costs, we consider it plausible that expertise may overtake overall cost as the dominant barrier to entry within the space domain generally.

However, the entry of private actors, bound by principles of profitability and subject to market conditions may unearth yet another barrier to entry, which has remained dormant beyond the current principal capital and expertise requirements. Given that within space industry markets have formed, these markets and its actors can be subject to market failures.<sup>8</sup> We focus on two types of failures here: first the market for private (and perhaps public) space actors may be distorted due to the presence of a monopolistic market (or similar) and second, existing space actors have shaped and limited the accessible domain through their previous and ongoing activities.<sup>9</sup>

#### **2.4. Considering the Last-Mover Disadvantage**

Late-movers into the space domain enjoy access to a mature marketplace of goods and services as well as a workforce that does not need to be built from the ground up.<sup>10</sup> Both of these can initially serve to limit the costs, and thus reduce the barrier of entry for these prospective space actors. At the same

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5 Decreasing costs have cascading effects that are beyond the scope of this paper, see e.g. for a discussion of this L. Signé, H. Dooley, How space exploration is fueling the Fourth Industrial Revolution, 28 March 2023, <https://www.brookings.edu/articles/how-space-exploration-is-fueling-the-fourth-industrial-revolution/>, (accessed on 08.01.2024).

6 See e.g. J. Coykendall, K. Hardin, A. Brady, A. Hussain, Riding the exponential growth in space, 22 March 2023, <https://www2.deloitte.com/uk/en/insights/industry/aerospace-defense/future-of-space-economy.html>, (accessed on 03.01.2024)

7 See e.g. World Economic Forum; Crowding and Competition in Space, in: The Global Risks Report 2022, Geneva, 2022, pp. 70-79.

8 Nb. that we use this term here not in the overly formalistic sense of economic theory, in which any inefficient allocation constitutes a market failure, but in a more colloquial sense the reader may be familiar with.

9 While monopolies are easily recognized as market failures, we suggest considering domain shaping and restriction as a matter similar to resource depletion and the sum total of available space for space activities to be a finite (i.e. limited) common pool resource, both rival and (potentially, and perhaps against dogma, see e.g. Alexander William Salter, Space Debris: a Law and Economics Analysis of the Orbital Commons, 19 Stanford Technology Law Review 221 (2016)) increasingly excludable for reasons outlined in this paper.

10 See for this generally e.g. V. Shankar, G. Carpenter, Late-Mover Strategies, in: Handbook of Marketing Strategy, Cheltenham, 2012, p. 369.

time, a mature but distorted market, e.g. through a monopolistic player, can in turn increase cost as the actor exercises their market power to enforce their price expectations or effect commercial realities unfavorable to others.<sup>11</sup> Existing research on monopolies (particularly in the technology sector) seems to confirm this as a potential detriment for late-movers. Beyond cost, prospective space actors are subject to the whims of the monopolist in other ways too. The regime of “duty-to-contract”, a safeguard to protect individual entities in the realm of national law when faced with a monopolist, is not readily apparent in the context of international space law. If a major space services provider with a monopolistic position chooses between servicing different prospective space actors, the provider may directly determine their viability.

We suggest that there is a second disadvantage a late-coming space actor faces, which is more indirect in nature. As existing space actors, either alone from a position of dominance or in concert and aggregate, shape the existing domain, the action potential for future space actors, i.e. the sum total of their potential space operations they can conduct (safely or legally) changes and is likely reduced. In past research, we have highlighted the effect of safety zones, restricting access to swaths of critical usable regions of outer space, thereby limiting the options of future space actors and forcing them into compliance with whatever risk mitigation regimes early-moving actors have imposed.<sup>12</sup> The same principle holds true across the domain: If large parts of the market are reliant on individual entities supplying resources, launch services or critical equipment, this will constrain the prospective space actor by itself. While we want to highlight particularly the effect on emerging public or private space actors, we note that due to either procurement lapses or privatization frenzies, this may further apply to established *heavy-weights* like NASA and the European Space Agency (ESA), with respect to launch services. If the dominant entities then, *qua* their factual power, further entrench the sector’s reliance on them, be it through corporate consolidation, political influence and lobbying or other means, the constraints are stronger still.

## 2.5. The Role of Antitrust and Competition Law

Typically, market distortion through anti-competitive behavior is regulated through antitrust and competition law. Both on national level and on a cross-

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11 Nb that both of these are independently critical issues and need not be immediately combined; see for a similar notion e.g. L. Khan, Amazon’s Antitrust Paradox, Yale Law Journal, 126:3, 2017, pp. 710-805. The reason why non-pricing effects are relevant here (as later described) is, among other things, because the inhibition of competitors may rob potential other customers (e.g. states) of relevant *competent and sufficiently built-up* private-sector counterparties to choose from.

12 M. Gartner, M. Friedl, Towards a Taxonomy of Safety Zones, 65 Proc. Int’l Inst. Space L. [forthcoming].

border level, frameworks have been constructed to preserve the integrity of markets and to ward off against collusion and monopolies. Even below the levels necessary to trigger these frameworks, fair competition requirements limit the actions market participants can take; both to protect their customers and the market participants themselves. However, the muscular frameworks present in particular within the European Union and within the United States have not been replicated on a global scale at this date. Indeed, it is necessary then to consider the implication of globally effective frameworks rooted in public international law and whether they are capable of fulfilling an equivalent role in preserving market integrity.

### **2.6. Atypicality of the Market for Space Services**

In parallel to the main argument presented here, we would be amiss to not to highlight that the market for space services is highly atypical. The market is largely dependent on public customers, both as service recipients and sources of funding.<sup>13</sup> This also means that financial flows are not always immediately intuitive, as stakeholder appeasement may be a driving factor.<sup>14</sup> A closer untangling of this is, alas, beyond the scope of this writing.

### **3. A Novel Argument towards Recognition of Market Limitations under Existing Sources of International Space Law**

Within this writing, we are presenting a central novel argument: market limitations pertaining to the domain of antitrust-esque frameworks can already be derived (in limited form) out of the existing body of (international) law pertaining to outer space. We will proceed as follows: First, we (briefly) survey appropriate legal frameworks to determine their relevance for the matter at hand. Second, we outline our central argument, first by recourse to the central precepts of the Outer Space Treaty and then by investigating in more detail the specific “limits” set out therein. Third, we outline how these implicit market limits are transferable to private actors via a treaty-native mechanism. Throughout these, we highlight that failure to conform to these market limits in turn represent breaches of the OST. Fourth we consider the Space Benefit Declaration as important context to our argument, showing that our concerns are mirrored there. Finally, we briefly touch on

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13 However, this is not to say that private investments are not steadily increasing, see e.g. C. Brown, C. Barcham, *Expanding Frontiers - The down to earth guide to investing in space*, May 2023, [strategyand.pwc.com/uk/en/reports/expanding-frontiers-down-to-earth-guide-to-investing-in-space.pdf](https://strategyand.pwc.com/uk/en/reports/expanding-frontiers-down-to-earth-guide-to-investing-in-space.pdf) (accessed on 05.01.2024). N.b. that the reports find that private investment is also highly concentrated on certain entities with especially strong market positions.

14 An example of this may be found in matters connected to the ESA Industrial Policy, see for this also below.

developments in the European Region, finding that this too has yet to produce an appropriate legal instrument for the problem at hand.

### **3.1. The Barren Antitrust Landscape of Space Law Frameworks (?)**

The list of existing, directly applicable, legally binding frameworks regulating the issues of matters of antitrust with regard to space activities seems fairly short. Critics and those who are faithful to the potential of benign regulation by the *invisible hand* will point out that there are none. There is no international treaty on antitrust rules for public and private space actors. Perhaps with the exception of the regulation of frequencies and slots in the geostationary orbit by the International Telecommunications Union (ITU), there seems to be little explicit safeguarding in other applicable treaties. Only upon closer inspection, however, (visions of) implicit market limitations are revealed by existing international space law.

### **3.2. Freedoms and Limitations under the Outer Space Treaty relevant to Antitrust – Concerns**

For the purpose of this inquiry, the Outer Space Treaty is the most promising source of antitrust-safeguards to be uncovered. However, neither the Outer Space Treaty (OST) (nor for this matter the other four UN treaties on outer space), mention the terms “antitrust”, “monopolization” or “competition law”.<sup>15</sup> Safeguards must hence be derived from existing provisions where their scope extends, in pursuit of their respective objective, into the domain of market integrity.

We suggest this is possible, following the logic hereafter. First, consider that the central precept of international space law is to safeguard access to space (and its benefits) for all. Second, consider that the OST sets out explicit limits to safeguard this central tenet: the treaty and principles contained therein ensure this in a number of ways, by allowing for open physical access to and from space, by imposing restrictions on the free use of outer space, where the rights and interests of others are concerned and by general regulations to ensure the continued safety of space operations. Third, we suggest that *access for all*, i.e. the central tenet, may be threatened by dysfunctional markets and

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15 See Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 10 October, 1967, 610 U.N.T.S. 205 [hereinafter OST]; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space, 3 December, 1968, 672 UNTS 119 [hereinafter ARRA]; Convention on International Liability for Damage Caused by Space Objects, 9 October 1973, 961 U.N.T.S. 187 [hereinafter LIAB]; Convention on Registration of Objects Launched into Outer Space, 15 September 1976, 1023 U.N.T.S. 15 [hereinafter REG]; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 11 July 1984, 1363 U.N.T.S. 3 [hereinafter MOON].

unfair competition in *certain* cases. Finally, if the above are valid, the OST *must* thus be understood to limit certain market behavior as well.

Let us consider the underlying assumptions respectively. The central tenet of *access for all* is derived out of the (authoritative) text of the treaty and (quite obviously) reflected in its provisions as a whole. We have addressed the way in which a dysfunctional market threatens the ambit of potential space actors in Section 2 (and will return to this in Section 5); it is a trivial subsumption to see these issues as threats against the *access for all* – principle.<sup>16</sup> The fulcrum then is the sum total of the potential *upper limits* set out by the OST, against which anti-competitive behavior may grate.

We suggest that (at least) the following set of provisions ought to be understood as containing such limits: (i) freedom of exploration and use (without discrimination) pursuant to Article I OST, (ii) freedom of access & right to visit pursuant to Articles I, XII OST, (iii) prohibition of national appropriation pursuant to Article II OST, (iv) the due regard principle pursuant to Article IX OST and (v) obligations with respect to information sharing pursuant to Articles VIII, IX, XI OST.<sup>17</sup> The principles enshrined herein describe one outer limit as to what behavior *and* what status is acceptable (and thus legal) under the OST. Naturally, a situation at odds with these principles can not only be caused by public actors; a situation violating these principles can be caused by private actors (the typical suspects under an antitrust lens) as well. In conclusion, it is our suggestion that this status can be brought upon by anticompetitive behavior and that anti-competitive behavior thus be understood, in certain cases, as violating these principles in turn.

It seems appropriate to add a significant *caveat* at this point. Firstly, when discussing upper limits, one cannot expect to end up with comprehensive nor finely detailed regulation, which brings about a universally desired utopian state of behavior. At best, it can guard against the worst excesses of a monopolistic market. Secondly, States, and international/regional

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16 A more systematic outline of this beyond the scope of this writing is left for another time, but we believe the avid reader will find it quite self-evident. We do highlight once again the absence of an immediately apparent obligation to engage with prospective space actors as a space services provider. This is fair in almost all cases, given the provider's freedom to contract; however the situation may become more murky when this decision is based on less worthy reasoning. This is less apparent with public actors; their preference following politics is a direct outflow of their connection to their government; however a private entity acting as such on the international market will likely have less justification to exclude e.g. only certain countries or geographical reasons for improper or political reasons.

17 For an initial analysis of how some of these principles, in particular with respect to the principles of free access, due regard and cooperation, might be relevant to when thinking about monopolization of outer space see for example Maria Rhimbassen, *An Introduction to Space Antitrust*, Open Lunar Foundation (1 June 2021), available at <https://www.openlunar.org/research/an-introduction-to-space-antitrust>.



organizations, where empowered to do so by their respective constituent documents, will want to retain a certain degree of flexibility in such a sensitive area. For example, the ever-growing practice of resorting to the use of unilateral coercive measures, a.k.a. non-UN sanctions, to achieve foreign policy goals will not halt where the atmosphere ends. Apart from measures justified as legitimate countermeasures pursuant to customary international law,<sup>18</sup> States will surely not accept an interpretation of, for example the principle of non-discrimination or information sharing which doesn't allow for lawful measures<sup>19</sup> to be taken in order to safeguard matters of national security, intellectual property and certain commercial interests.

### **3.3. The Operationalization of the OST's Implicit Market Limitations for Operators**

It is paramount to keep in mind that the subject of consideration here is still public international law, the subject of which are *States*. Based on the classic conception of mediatization of the individual in public international law, the OST does not regulate non-governmental entities directly. With regard to private actors, it introduced a system of comprehensive attribution of the responsibility for space activities to their national States. In doing so, while providing for an all-encompassing, elegant solution under public international law, the treaty's drafters seemingly failed to anticipate the apparent need to bring private space operators into the sphere of directly applicable international regulation. Bridging this gap requires then to understand States' obligations to ensure that private operators act in certain ways.

Indeed, the treaty-native mechanism of Article VI of the OST obliges and empowers States to authorize and continuously supervise the space activities of "their" non-governmental space operators. To this end, States are afforded, or rather retain, jurisdiction and control over space objects registered on them and experience attribution in return.<sup>20</sup> Therefore, States have the means (and incentives) to enact (single-handedly, in coordination with a group of nations or, should they so decide, supranationally) measures to limit distortions of the global space market in order to provide fair and equal access for all. Thus, in light of the upper limits found above to have been set by the OST, international space law not only affords States the tools to regulate anti-competitive behavior by market participants under its jurisdiction; it also obliges States to do so: authorization and supervision

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18 As codified in the *Articles on the Responsibility of States for Internationally Wrongful Acts with Commentary*, ILC Yearbook 2001/II (2) [hereinafter: ARSIWA], Arts. 22, 49 ff; drafted by the International Law Commission.

19 Compare ARSIWA, Art. 54.

20 Art. VII OST.

must (also) extend to safeguarding *access for all* against anti-competitive behavior.

Again, we stress that the treaties do not require a specific “national space law” to fulfill these obligations, nor do relevant non-legally binding guidelines mention antitrust considerations explicitly.<sup>21</sup> As long as the ends of the treaty are met and their obligations complied with, States are free in their choice of means to effect this on the domestic level.<sup>22</sup> Defining the minimum threshold, national space legislation must meet, Prof. Bin Cheng, a preminent figure of international space law scholarship, emphasizes that States are responsible for

“ensuring that the space object or any person involved with it, does nothing which may constitute a breach by an of the states concerned of their international obligations under general international law, the Charter of the United Nations and the [Outer] Space Treaty, which inter alia contains provisions against harmful contamination of the environment, and more ambiguously, [...] any act of commission or omission of the space object or by those involved as if it were committed by an agency of the states themselves.”<sup>23</sup>

As a consequence, insofar as anti-competitive behavior by non-governmental space actors violates the OST, or other provisions of space law for that matter *by means of bringing upon a status in which the outer limits described above are breached*, States must prevent or remedy such behavior respectively. According to Article 2 of ARSIWA, an internationally wrongful act attributable to a State may be committed by an action or an omission. If States fail to prevent a violation by any of the non-governmental entities conducting space activities, which are attributable to them, it may constitute an internationally wrongful act.<sup>24</sup> This may be either by attributable *action* of the non-governmental entity or by an *omission* of the State (Party to the OST) to regulate and, in doing so, authorize and continuously supervise the

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21 See Report of the Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space on the work conducted under its multi-year workplan of 3 April 2012 (A/AC.105/C.2/101).

22 M. Gerhard, *Article VI* in S. Hobe et. al. (eds.), *The Cologne Commentary on Space Law Vol. I, English-Russian bilingual ed.*, Berliner Wissenschafts-Verlag GmbH, 2017, p. 415.

23 B. Cheng, *Studies in International Space Law*, First ed., Clarendon Press Oxford, 1999, p. 639.

24 M. Gerhard, *Article VI* in S. Hobe et. al. (eds.), *The Cologne Commentary on Space Law Vol. I, English-Russian bilingual ed.*, Berliner Wissenschafts-Verlag GmbH, 2017, p. 412.

non-governmental entities' space activities and to assure that the latter are carried out in conformity with the OST.<sup>25</sup>

In conclusion, States are obliged to effectuate their substantive obligations to prevent certain excesses of anti-competitive behavior under the OST, by also ensuring compliance by their non-governmental actors therewith; a necessary outflow of their *access for all* – obligations under the OST.

Looking forward, the absence of treaty-native sanctions for non-compliance and the characteristic want of compulsory dispute settlement procedures in case of alleged violations promote a patch-work of highly fragmented regulation of parts of the global space market, driven by ideological concerns, limits to practicability of regulation, and different legal traditions. Additionally, despite all aspirations of international cooperation, peaceful uses of outer space, and the principle of non-discrimination, political issues extraneous to space activities, will continue to impede decisive communal action on a global level including the implementation of an appropriate antitrust regime for space activities.

### 3.4. The Work of the UN Committee on the Peaceful Uses of Outer Space

As a further relevant phenomenon, it is worthwhile to also consider the work of the UN Committee on the Peaceful Uses of Outer Space (UN COPUOS), the origin of the five main UN treaties on outer space,<sup>26</sup> since the inception of the OST. After what some dubbed the “treaty-making era”, it continued to draft *principles and recommendations*, for consideration by the UN General Assembly.<sup>27</sup> Some of them contain implicit market-limiting aspects, in order to ensure sustainable and equal access to space. Examples are the Remote-Sensing Principles, the Guidelines on the Long-term Sustainability of Space Activities and the Space Debris Mitigation Guidelines. The most direct example of an attempt to create market-limiting principles, in order to ensure full participation and access to space for all, is the Space Benefits Declaration.<sup>28</sup>

While the modern space market seems to have been fairly unpredictable 30 years ago, none of our considerations mentioned above is unprecedented. As far back as 1996, the UN General Assembly passed the Space Benefits Declaration. Besides reiterating the precept of the OST, which is the freedom of exploration and use of outer space for all States, irrespective of their state of development, it already stipulated that “[c]ontractual terms in such

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25 Compare Art. VI OST.

26 Michael Friedl, Christopher Johnson (ed.), *The COPUOS Briefing Book*, First edn., Secure World Foundation, 2023, p. 6.

27 *Ibid*, pp. 6 ff.

28 United Nations General Assembly, *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries*, Resolution A/51/122 of 15 December 1996.

cooperative ventures should be fair and reasonable and they should be in full compliance with the legitimate rights and interests of the parties concerned as, for example, with intellectual property rights.”<sup>29</sup> This sentence provides not a solution, but at least a trace of the interests, which a space market regulation regime should consider. This more explicit notion is well complimenting programs actively encouraging and supporting emerging space actors, such as the UN Office for Outer Space Affairs’ Access to Space For All Initiatives and its Space Applications Programme more broadly; at the same time highlighting that these will not sufficiently supplement action to preserve the point of entry, both figuratively and actually, for prospective space actors from emerging space nations. While obviously non-legally binding, as a UN General Assembly resolution, the Space Benefits declaration demonstrates that anticompetitive behavior in the space sector is a global concern, thus squarely within the mandate of international bodies and organizations, such as the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and the ITU.

### 3.5. Developments in the European Region

Turning away from classic public international law, we finally consider European Union Law. The European Union is both an example of one of the strongest multinational / supranational antitrust regimes as well as the phenomenon of keeping the sensitive area of space operations as a domain reserved to national governments of its member States. Generally, EU antitrust rules should also apply to the European space industry.<sup>30</sup> This does not, however, solve most of the monopolization issues described above. While the EU has a space program, operated jointly with the ESA, there is no “EU Space Law” yet, neither in the field of competition nor otherwise. So far, EU member States recognize the diligence of pooling funding and capabilities in a joint space program, but harmonization of their national space legislations is explicitly prohibited by the EU’s constituent documents.<sup>31</sup> Thus, even the most integrated regional organization of today has not yet submitted to direct international/regional regulation of its space activities and markets. We note however, that there is significant movement in this space,

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<sup>29</sup> *Ibid*, para. 2.

<sup>30</sup> For an overview of the legal, historical and political reasons for the regulatory status quo and why this question is more complicated than that, *see generally* Frans G. von der Dunk, *The European Union and Space – Space for Competition*, 61 Proc. Int’l Inst. Space L. 285 (2018).

<sup>31</sup> European Union, *Consolidated version of the Treaty on the Functioning of the European Union*, 13 December 2007, 2008/C 115/01, Arts. 4 para. 3, 189 para. 2; *see further* Frans G. von der Dunk, *The European Union and Space - Space for Competition*, 61 Proc. Int’l Inst. Space L. 285 (2018) p. 295.

with a first proposal expected to arrive in 2024; to date it is unclear if any antitrust-esque components would be included.<sup>32</sup>

It is also worth mentioning that, distinct from the EU and its EU Agency for the Space Programme (EUSPA), ESA has a specific “Industrial Policy”, which foresees that, when procuring goods or services, ESA has to “ensure that all Member States participate in an equitable manner, having regard to their financial contribution, in implementing the European space program and in the associated development of space technology; in particular the Agency shall, for the execution of its programs, grant preference to the fullest extent possible to industry in all Member States, which shall be given the maximum opportunity to participate in the work of technological interest undertaken for the Agency”.<sup>33</sup> This makes the ESA Convention a treaty that most directly addresses market consideration within the space sector. However, the Convention’s command that ESA is to “exploit the advantages of free competitive bidding in all cases” is directly followed by the *caveat* “except where this would be incompatible with other defined objectives of industrial policy”.<sup>34</sup> In light of the co-existence and necessary cooperation between these two European space organizations, any antitrust measures passed by the EU legislature must necessarily be conceived in harmony with ESA’s industrial policy.<sup>35</sup> Ultimately, even more advanced models of supranational governance (like the EU) and well-tried-and-tested regional space organizations (like ESA) have yet to grapple with how to create, preserve and regulate a space market that isn’t wholly dominated by State actors and public programs any longer.

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32 The proposal is subsumed under the initiative “A Europe fit for a digital age”, see U. v.d. Leyen, M. Šefčovič, State of the Union 2023 / Letter of Intent, 13 September 2023, available at [https://state-of-the-union.ec.europa.eu/system/files/2023-09/SOTEU\\_2023\\_Letter\\_of\\_Intent\\_EN\\_0.pdf](https://state-of-the-union.ec.europa.eu/system/files/2023-09/SOTEU_2023_Letter_of_Intent_EN_0.pdf), (accessed on 14.01.2024).

33 Convention for the Establishment of a European Space Agency, Art. VII para. 1 lit. c, May 30, 1975, 1297 U.N.T.S. 161.

34 *Ibid.*, art. VII para. 1 lit. d.

35 Frans G. von der Dunk, The European Union and Space - Space for Competition, 61 Proc. Int'l Inst. Space L. 285 (2018) pp. 297-299; although not the focus of this article, for a summary of the existing space sector case law by the European Commission, acting in its capacity as direct enforcement agency of EU competition law see Marco Ferrazzani & Ioanna Thoma, Private and Public Space Activities in Europe through the Lenses of EU Competition Law, 61 Proc. Int'l Inst. Space L. 267 (2018) pp. 282-283; for a more theoretical or prognostic account of potential developments in the European and global space markets and their possible ramifications under EU competition law, see: Stamatis Vassilopoulos, Monopolies in Outer Space: Is Europe Ready?, 48 Air & Space Law No. 4&5 (2023) 445-456.

#### 4. **Perspective of Emerging Space Nations and Developing Nations**

Weak protection of prospective space actors, both private and public, holds particular weight for emerging space nations and/or developing nations. As these are entering the domain at a later stage, they do so subject to constraints imposed by previous space actors.

We suggest that there are two factors to this. First, when entering the domain at a later stage (and perhaps with fewer resources), an emerging space nation will be more likely to engage on the market similar to a private actor, purchasing know-how, services, infrastructure and equipment instead of developing it themselves. This makes them vulnerable to anti-competitive behavior in general.

Second, they suffer from the *crowding* of the domain and the standards that have developed thus. Just as newly launched space assets must navigate through and respect the ever-increasing number of satellites, they may be affected by space traffic management or equipment requirements (imposed e.g. by launch-site or safety zones). It is the technical requirements that may be hoisted onto prospective space actors that may create particular concerns: if certain propulsion or communication equipment is manufactured only by a limited number of space actors and sold subject to market distortion, this may complicate potential (safe) space activities significantly. Similarly, if a monopolistic actor, through exclusivity agreements and other steering measures, effects higher costs, e.g. depending on an emerging space nation's political affiliation, the prospective space actor's access is arguably impaired. Thus, not only private space actors (of any jurisdiction) but in particular emerging space nations and / or developing nations themselves would stand to benefit from robust protection mirroring antitrust and competition law frameworks. We note that at least in the view of some States, the Outer Space Treaty's general freedoms particularly safeguard the interests of emerging space against growing monopolization.<sup>36</sup>

#### 5. **Existing and Future Remedies against Anti-Competitive Behavior under International Space Law**

As our analysis shows, the current legal situation is ambiguous at best, when it comes to combating market participant behavior that would be deemed unacceptable under a framework of competition law and antitrust. Directly

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36 See e.g. the Statement of the Republic of Austria on 20 March 2023 on the occasion of the 62nd session of the Legal Subcommittee to UN COPUOS on agenda item 10 General exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources, available at [https://www.unoosa.org/documents/pdf/copuos/lsc/2023/Statements/20\\_PM/10\\_Austria.pdf](https://www.unoosa.org/documents/pdf/copuos/lsc/2023/Statements/20_PM/10_Austria.pdf); see further Report of the Legal Subcommittee on its 62nd session, held in Vienna from 20 to 31 March 2023, A/AC.105/1285, at paras. 189-190.

applicable regulation is scarce and localized frameworks are likely of little effect. We are then left with the usual: extensive interpretation of existing sources of space law, in which measures of protecting market integrity will align well with their object and purpose, but whose self-executing nature is questionable at best. As elaborated above, this does not mean that existing international space law, including for example the OST, the MOON (in very limited capacity) and the ITU regulations don't contain implicit market limitations. Omissions by States to regulate certain market behaviors, may violate certain obligations under principles of international space law, but the difficulty in filling these principles with life vis-à-vis private space actors, a classic staple of public international law, impedes the fair regulation of the global space market at a critical time to preserve not only the legal right, but also the factual possibility of access to space for all.

From a legal dogmatic point of view, suggesting the development of new norms and mechanisms is dissatisfying, but if the *lex lata* is insufficient, considerations *de lege ferenda* should be permitted. Options to consider, loosely ordered in their likelihood, are:

- the introduction of harmonious international standards for equipment, similar to international air law, to reduce cost, including the definition of uniform standards of equipment, which must be accepted as sufficient by market participants;
- the limited mandatory access and contracting obligations: enticing or obliging dominant private space actors to offer their services at certain prices and / or conditions on a national, regional or global market, under careful consideration of the upfront risk and investment by early movers. This consideration extends naturally to access to space stations, safety zones and orbits;
- the creation of an international space traffic management body, potentially going beyond information exchange mechanisms towards establishing a regulatory mandate; and finally
- the creation of a comprehensive treaty on the rights and obligations of private space actors.

Without prejudice to an unlikely later legally binding regime, we recommend that UN COPUOS start by investigating the issues brought up in this writing under a dedicated agenda item; fitting perhaps under the mandate of the existing Working Group on the Status and Application of the Five UN Space Treaties with the view to draft a set of non-legally binding principles to that effect.

## **6. Conclusions**

Our analysis has revealed seemingly substantial gaps in current regulation of the global space market. We suggest that the existing toolbox is not empty when it comes to anti-competitive behavior, and that states have an obligation to safeguard against the word outflows of anti-competitive behavior of private space actors. Specifically, we show that the OST gives States most of the tools they need to enact cooperative fair market competition regulation on a national level while imposing on them the obligation to do so in particularly egregious cases. We have highlighted that this is of particular importance not only due to the importance of a functioning space market generally, but because emerging space nations will suffer particularly from a distorted market. Nonetheless, our approach does not heal the lack of narrower, more targeted regulation in the space domain and any approach will fail without harmonization. We thus suggest potential ways towards ensuring space market integrity.

Ultimately, States will find that living up to and exceeding their obligation to steer the space economy towards inclusivity and fairness, will not only enable them to better comply with their obligations under international law, but also benefit the global space market by fostering openness and innovation.