

# What Level of Detail in National Commercial Space Legislation Is Ideal for the Harmonization and Enforcement of Such Legislation and the Outer Space Treaty?

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## **Abstract**

Most national commercial space legislation imposes a general obligation to comply with the Outer Space Treaty, often by reference to compliance with international obligations generally, on commercial entities seeking authorization to engage in space activities. Accordingly, a low-level or minimalistic harmonization exists in this respect. However, different wording in national space laws of even this very generally worded obligation as well as failure to include such an obligation in a select number of national space laws makes such harmonization imperfect. The consequences of this minimalistic, imperfect harmonization are a reduction in potential transparency benefits to private parties and missed opportunities to advance a coalescence of views of countries around Outer Space Treaty obligations. More detail in national space legislation regarding what the Outer Space Treaty requires may assist in achieving greater coalescence of views among countries of Outer Space Treaty obligations beyond what can be achieved relying on diplomacy alone within the UN Committee on Peaceful Uses of Outer Space (UNCOPUOS) and in other forums. It may also provide more transparency and certainty to private parties and confirm that OST obligations are minimally burdensome for commercial entities, thereby helping their business cases and expanding commercial space innovation and investment.

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## 1. Introduction

Harmonization of national commercial space legislation can have many benefits but can be difficult to achieve given competing priorities and different legal systems. The particular aspect of harmonization that this paper explores is the level of detail in national commercial space legislation regarding compliance with Outer Space Treaty (OST) obligations.<sup>1</sup> The OST has a very unique provision, Art. VI that provides:

States Parties to the Treaty *shall bear international responsibility for national activities in outer space*, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or *by non-governmental entities*, and for *assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty*. *The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.* ...<sup>2</sup>

Under general international law, states are typically not responsible for their private actors' (corporations or individuals) conduct.<sup>3</sup> A government would generally have to direct or control their private actors' conduct or adopt it as its own in order to be responsible under international law for the conduct. But Article VI of the OST makes parties internationally responsible for their private actors' activities in outer space and requires them to authorize and supervise those activities, in part to assure other countries of compliance by their private actors' with OST obligations.<sup>4</sup> (It is important to note that OST obligations, properly interpreted under the Vienna Convention on Law of Treaties, are minimally-burdensome on private actors' activities).<sup>5</sup> Given OST Article VI, it is perhaps unsurprising that most national commercial space

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1 For a more comprehensive comparative examination of many different aspects of national space law, *see generally*, Irmgard Marboe, 'National Space Law,' in von der Dunk (ed.), *Handbook of Space Law*, Northampton, Edward Elgar Publishing, 2015, pp. 127-204.

2 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies [hereinafter "Outer Space Treaty" or "OST"], available on the United Nations Office of Outer Space Affairs (UNOOSA) web site.

3 *See* Matthew Schaefer, 'The Contours of Permissionless Innovation in the Outer Space Domain,' *Univ. of Pennsylvania Journal of International Law*, Vol. 39, Fall 2017, pp. 138-143; *see also* UN International Law Commission, *Articles on Responsibility of States for Internationally Wrongful Acts*, U.N. Doc. A/56/10, pp. 65-70 (2001).

4 *See id.*; *See also* Frans von der Dunk, 'The Origins of Authorization: Article VI of the Outer Space Treaty and International Space Law,' in von der Dunk (ed.), *National Space Legislation in Europe: Issues of Authorisation of Private Space Activities in the Light of Developments in European Space Cooperation*, Studies in Space Law, Leiden, The Netherlands, Martinus Nijhoff Publishers, 2011, pp. 3-28.

5 *See* Schaefer, *supra* note 3, at pp. 143-53.

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legislation contains a general obligation to comply with the OST, often times by reference to international obligations generally, on commercial entities seeking authorization to engage in space activities. In sum, an examination of national space laws indicates a low-level or minimalistic harmonization in this regard. However, different wording in these national space laws concerning this obligation, and a few national space laws lacking any such obligation at all, makes such minimal harmonization imperfect. Minimalistic, imperfect harmonization on this particular feature of national space law fails to maximize potential transparency benefits to private parties and does not advance a coalescence of views among countries with regard to OST obligations. More detail in national space legislation regarding what the OST requires can assist in achieving greater coalescence of views among countries beyond reliance solely on diplomacy within the UN Committee on Peaceful Uses of Outer Space (COPUOS) and in other forums. Offering greater detail might also provide more transparency and certainty to private parties and might also assist in confirming that OST obligations are minimally burdensome for commercial entities, thus helping their business cases and expanding commercial space innovation and investment. Recent space legislation adopted by New Zealand indicates that providing further detail of OST obligations in national space legislation is possible. However, legislating on a blank slate is often easier than achieving amendments to existing legislation. Therefore, any drive towards harmonization of national space legislation around a somewhat greater level of detail of what the OST requires with respect to their private parties' space activities will take a concerted effort.

This article focuses on the OST because of its unique Art. VI provisions and because the other major space law treaties do not as directly impact private actors, both due to the nature of their obligations and the more limited scope of those treaties. The Liability Convention only imposes liability on states parties, not private parties, for damage caused by space objects.<sup>6</sup> Of course, many countries have enacted provisions in their national space law requiring insurance be obtained by private parties for damage caused by their space objects or otherwise contain provisions requiring indemnification by private parties of any government claims paid out under the Liability Convention.<sup>7</sup> However, there have been virtually no claims made under the Liability Convention with the possible exception of a claim by Canada arising out of the crash of a Soviet nuclear powered satellite in Northwest Canada in 1979,

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6 See Convention on International Liability for Damage Caused by Space Objects [hereinafter "Liability Convention"], available on UNOOSA web site.

7 See, e.g., Matthew Schaefer, 'The Need for Federal Preemption and International Negotiations Regarding Liability Caps and Waivers of Liability in the U.S. Commercial Space Industry,' *Berkeley Journal of International Law*, Vol. 33, 2015, pp. 230-241.

a claim that obviously did not involve private party space activity.<sup>8</sup> The Return and Rescue Agreement, further elaborating on OST Art. V, is essentially event driven (e.g. providing assistance to an astronaut in distress or returning the space object of one country when found by others outside the jurisdiction of that country), and does not involve planned space activities by private parties that might be reviewed in advance.<sup>9</sup> The Registration Convention, with 69 nations becoming parties, is subscribed to by less than two-thirds of the 109 countries that are party to the OST. Further, the Registration Convention only places obligations on countries regarding maintenance or information for national and international registries of space objects, although several national space laws obligate private parties to provide the requisite information to the government for their space objects so that the government can maintain a national registry and also inform the United Nations as regards the international registry of space objects.<sup>10</sup>

## **2. Minimal and Imperfect Harmonization in National Space Legislation That Acknowledges the Necessity or At Least Desirability of Complying with the Outer Space Treaty**

The United States, unlike (nearly) all other countries maintaining national space legislation, maintains a siloed approach to authorizing space activities – the Federal Aviation Administration (FAA) licenses launch and reentry,<sup>11</sup> the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Dept. of Commerce (DOC) licenses remote sensing,<sup>12</sup> and the Federal Communications Commission (FCC) licenses spectrum usage.<sup>13</sup> However, the United States Congress did not expressly grant on-orbit authorization authority to any US federal agency for non-traditional space activities – those going beyond remote sensing and spectrum usage -- and thus a potential gap arguably exists.<sup>14</sup>

8 See Eilene Galloway, ‘Nuclear Powered Satellites: The USSR Cosmos 954 and the Canadian Claim’, *Akron Law Review*, Vol. 12, 1979, pp. 401 *et seq.*

9 Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Space Objects Launched in Outer Space [hereinafter “Return and Rescue Agreement”], available on UNOOSA web site. See generally, Frans von der Dunk, ‘International Space Law’ in von der Dunk (ed.), *Handbook of Space Law*, Northampton, Edward Elgar Publishing, 2015, pp. 78-81.

10 Convention on the Registration of Objects Launched into Outer Space [hereinafter “Registration Convention”], available on UNOOSA web site; *see generally*, von der Dunk, *supra* note 9, pp. 94-98.

11 51 U.S.C. Ch. 509.

12 51 U.S.C. Sec. 60101 *et seq.*

13 47 U.S.C. Sec. 701-769. France LOI no. 2008-518 du 3 Juin 2008 relative aux operations spatiales,” Ch.2, Article 4, unofficial translation in 34 *Journal of Space Law* 453, 456 (2008).

14 See Schaefer, *supra* note 3, pp. 153-157.

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The authority granted by statute to the FAA includes the following commands:

e) Foreign Countries.—The Secretary of Transportation shall—

(1) carry out this chapter *consistent with an obligation the United States Government assumes in a treaty, convention, or agreement* in force between the Government and the government of a foreign country; ....<sup>15</sup>

But the US statute does not state with specificity what OST obligations the FAA must have private parties comply with in order to be authorized. The U.S. Executive Branch, specifically the U.S. State Department, has the power to interpret treaties for the United States internationally and the FAA consults with the State Department on such issues. Thus, discussions occur in specific instances regarding OST obligations, but the statute does not give any specific list of what OST obligations might impact consideration of a license application. The only other mention in statute that comes close to laying out OST provisions is one that declares that “the peaceful uses of outer space continue to be of great value and to offer benefits to all mankind.”<sup>16</sup> This language borrows or paraphrases key terms from OST Article I (“benefit” and “all mankind”) and OST Article IV (“peaceful purposes”) but that statement falls far short of laying out what specific obligations the OST contains.

In its simplicity and lack of detail regarding what OST commitments encompass, the U.S. statute granting the FAA launch licensing authority is similar to many other nation’s commercial space activity licensing statutes.<sup>17</sup> For example, France’s national space legislation provides:

*Authorizations cannot be granted when the operations for which they were requested, regarding in particular the systems intended to be implemented, are likely to jeopardize national defense interests or the respect by France of its international commitments.*<sup>18</sup>

The Belgium space law is similar to the French one, although it specifically mentions the OST but with no elaboration of the details of the OST. It provides the following:

Art. 4. §1. Any person wanting to carry out the [space] activities referred to in this law must obtain the prior authorisation of the Minister, in accordance with the following provisions. §2. Authorisation is granted on a personal basis to the operator submitting the application and is non-transferable. §3. *The activities must be carried out in accordance with international law and, in particular, with*

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15 51 USC 50919(e)(1).

16 51 USC 50901(a)(1).

17 On national space laws, *see generally*, Marboe, *supra* note 1.

18 France LOI no. 2008-518 du 3 Juin 2008 relative aux opérations spatiales,” Ch.2, Article 4, unofficial translation in *Journal of Space Law*, Vol. 34, 2008, pp. 455-56.

*the principles laid down in the Outer Space Treaty and the other treaties and agreements to which Belgium is a party.*<sup>19</sup>

Again, compliance with the OST (and other relevant treaties) is required for authorization but there is no detail on what OST obligations entail or what they require.

Denmark's national space law is also limited to conditioning approval of space activities on compliance with international obligations generally. Denmark's space law provides:

### Part 3 Approval of space activities

5. A space activity may only be carried out after prior approval from the Minister for Higher Education and Science.

6. (1) Approval under section 5 is to be based on an application from the operator and requires documentation of the following: ... 6) *that the space activity which the application concerns does not conflict with national security interests, Denmark's international obligations or foreign-policy interests.*<sup>20</sup>

To be fair the Danish law also requires as conditions that the “operator has taken appropriate measures with regard to space debris management” and that the “space activity ...is carried out in an environmentally safe manner.”<sup>21</sup> One might view space debris management as a specific application of the obligation to give “due regard” to others’ space activities in Article IX of the OST, but nothing in Art. IX acts as an absolute prohibition on space debris creation. Rather, the UN Committee on Peaceful Uses of Outer Space (UNCOPUOS) has adopted space debris mitigation guidelines in legally non-binding (i.e. political commitment) form and the language concerning space debris in the statute is more likely an implementation of those non-binding commitments.<sup>22</sup> The language concerning “environmentally safe manner” may be a broad enough to include, or even an indirect reference to, OST Article IX’s requirement to:

...pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.

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19 Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects consolidated text as revised by the Law of 1 December 2013 (B.O.J. of 15 January 2014), available on UNOOSA web site.

20 Denmark Outer Space Act, unofficial translation based on the latest official Act no. 409 of 11 May 2016, Sec. 6(6), available on UNOOSA web site.

21 *Id.*, Sec. 6(4), (5).

22 See Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, available at [https://www.unoosa.org/pdf/publications/st\\_space\\_49E.pdf](https://www.unoosa.org/pdf/publications/st_space_49E.pdf).

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But it is unclear if the Danish law's "environmentally safe manner" does include these obligations given its failure to more closely and specifically track the language of OST Art. IX. There are a number of other national law's that contain references to space debris limitation and/or environmental protection, but for the reasons given with respect to Danish law these are not clear attempts at implementing legally binding commitments found in the OST.

Australian space law provides authority to reject a launch permit if "the Minister does not consider that, for reasons relevant to Australia's national security, foreign policy or *international obligations*, the launch permit should be granted ..."<sup>23</sup> While the language "consider" may be somewhat weaker than some of the laws examined above, the Australian space law also provides that one of its objects is "to implement certain of Australia's obligations under the UN Space Treaties."<sup>24</sup> Thus, like the American, French, Belgian, and Danish examples above, Australian law appears to insist on compliance with the OST by referencing international obligations generally as well as expressing its purpose to implement UN Space Treaties, a reference that includes the OST. Similar to the other national space laws discussed above, nowhere in the Australian law is there any detail in what OST obligations encompass or the specific requirements that would be of relevance for private party space activity. Recent 2018 amendments adopted to the Australian law do not add any further detail on OST obligations.<sup>25</sup> Indeed, as regards the Minister's ability to deny a launch permit, the 2018 amendments change the language concerning "international obligations" to "international relations."<sup>26</sup> While international relations considerations certainly include violations of international commitments, both terms could have been utilized in the criteria the Minister may consider in declining to grant a launch permit. South Africa's national space legislation is quite similar to those discussed above, although perhaps also worded less strongly in that it is only requiring international obligations to be "*taken into account*" when establishing conditions for a license.<sup>27</sup>

The United Kingdom's newly enacted Space Industries Act of 2018 (UKSIA18) similarly only requires the regulator to "*take into account...any international obligations*" of the United Kingdom. Furthermore, it is possible

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23 Australia Space Activities Act 1998, Act No. 123 of 1998 as amended, Sec. 26(3)(g), available on UNOOSA web site.

24 *Id.*, Sec. 3.

25 Space Activities Amendment (Launches and Returns) Act 2018, No. 92, 2018, An Act to amend the *Space Activities Act 1998*, and for related purposes, available at Australian Government, Federal Register of Legislation, <https://www.legislation.gov.au/Details/C2018A00092>.

26 *Id.*, Sec. 63.

27 Statutes of the Republic of South Africa - Trade and Industry No. 84 of 1993, (Assented to 23 June 1993), Sec. 11(2)(c), available on UNOOSA web site.

under UKSIA18 that international obligations may give way, in the event of conflict, to a number of other interests, including the requirements of persons carrying out spaceflight activities and the requirements of persons with interests in property carried by spacecraft. However, many in the space industry state that compliance with international obligations helps their business case by providing certainty, avoiding foreign backlash, and keeping open trade and investment flows for their products, services and business.<sup>28</sup> From this viewpoint, international obligations are unlikely to conflict with the requirements of space operators and OST compliance will not be compromised.

Thus, the national space laws of the United States, France, Belgium, Denmark, Australia, South Africa, and United Kingdom indicate that there is some minimum harmonization existing in national space legislation to require, or at least strongly take into account, compliance with the OST (often by referencing international obligations generally) when authorizing or licensing commercial space activities. However, the low-level or minimum harmonization currently achieved in national space legislation regarding compliance with OST is imperfect or incomplete. Some national space legislation governing licensing or authorization of private space activities does not even explicitly mention compliance with the OST or international obligations generally. For example, Sweden's national space legislation states:

Space activities may not be carried on from Swedish territory by any party other than the Swedish State without a license. Nor may a Swedish natural or juridical person carry on space activities anywhere else without a license.<sup>29</sup>

Sweden's space law merely states that a "license may be restricted in the way deemed appropriate with regard to the circumstances. It may also be subject to required conditions with regard to control of the activity or for other reasons."<sup>30</sup> Norway's law is similar to Sweden's law in omitting mention of international commitments in its legislation.<sup>31</sup> While in no way indicating or suggesting that Sweden or Norway would ignore its international obligations and realizing that OST considerations may be considered in regulations or simply in the processing of license applications<sup>32</sup>, it would be preferable for

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28 See, e.g., Testimony of Mike Gold, Peter Marquez, & Matthew Schaefer, US Senate Commerce Committee's Space Subcommittee, 'Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space,' May 23, 2017, video of hearing available at <https://www.youtube.com/watch?v=4DY10d8r5q8>.

29 Sweden - Act on Space Activities (1982:963), Sec. 2.

30 *Id.*, Sec. 3.

31 Norway - Act on launching objects from Norwegian territory etc. into outer space, 13 June. No. 38. 1969.

32 For example, Sweden's Decree on Space Activities issued in 1982, the same year as its legislation, does require the Sweden National Board for Space Activities to keep a



reinforcement of OST obligations and transparency and certainty for private parties if national space legislation harmonized at least at the very minimum level of recognizing that compliance with the OST is a required condition to authorizing private space activity.

### 3. **What Obligations in the OST do Countries Need to Assess When Authorizing Commercial Space Activities and What Details Might Be Included in National Space Legislation**

OST Art. IV's arms control provisions ban weapons of mass destruction in outer space and prohibit the creation of military installations and testing of weapons on celestial bodies, provisions that obviously do not impact business plans of any legitimate commercial actor but may nonetheless be important to make sure they are complied with by non-state actors generally, especially given modern problems with terrorism and rogue proxy actors. A number of countries have laid out, or at least attempted to lay out, Art. IV obligations in their national space legislation, including Ukraine and Russia in the greatest detail.<sup>33</sup> Ukrainian and Russian space laws also require compliance with international obligations generally.<sup>34</sup> However, the prohibitions laid out in Ukraine and Russia laws (as translated) do not track OST Art. IV language in all respects. Indeed, some of the prohibitions are not consistent with generally followed interpretations of certain OST language. For example, "peaceful purposes" is generally interpreted to mean non-aggressive, not non-military.<sup>35</sup> Yet, Ukraine law and Russian law prohibit "use of the Moon and other celestial bodies for *military purposes*," whereas OST Art. IV only states that the "moon and other celestial bodies shall be used by all States Parties to the Treaty *exclusively for peaceful purposes*."

But are there any other obligations that governments must impose as conditions on authorization of space activities by private actors in order to uphold their OST Art. VI obligations to provide assurance that commercial

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national register of space objects in accordance with the Registration Convention. See Decree on Space Activities (1982:1069), Section 4, available at UNOOSA web site.

33 Ordinance of The Supreme Soviet of Ukraine, On Space Activity, Law of Ukraine of 15 November 1996, Articles 9, available on UNOOSA web site; Law of Russian Federation about Space Activity, Decree No. 5663-1 of the Russian House of Soviets, Art. 4(2), available on UNOOSA web site.

34 Ordinance of The Supreme Soviet of Ukraine, On Space Activity, Law of Ukraine of 15 November 1996, Articles 9 & 17, available on UNOOSA web site; Law of Russian Federation about Space Activity, Decree No. 5663-1 of the Russian House of Soviets, Art. 4(2) & 26(3), available on UNOOSA web site.

35 See Jack Beard, 'Soft Law's Failure on the Horizon: The Code of Conduct for Outer Space Activities,' *University of Pennsylvania Journal of International Law*, Vol. 38, 2017, pp. 337-38.

operators will carry out their activities in conformity with obligations in the treaty? There are just a few minimally burdensome obligations that might implicate commercial space operations that can be distilled from the dozen or so articles of the OST that lay out substantive obligations. Specifically, governments should ask whether the entity seeking authorization is engaging in activity that involves any of the following:

- 1) Does the planned activity claim surface or sub-surface rights on a celestial body or prevent free access to all areas of celestial bodies, keeping in mind legitimate rights for their operations to be free from harmful interference? (OST Arts. I, II & IX)
- 2) Does the planned activity cause potentially harmful interference with foreign space activities? (OST Art. IX)(specifying that this requires advance consultations but does not act as an absolute bar to proceeding)
- 3) Does the planned activity risk harmful contamination of a celestial body with Earthly matter or adverse changes to the Earth environment from extraterrestrial matter? (OST Art. IX)
- 4) Is the applicant respecting ownership rights of a foreign operator's space object? (OST Art. XIII)(e.g., relevant for space debris remediation)<sup>36</sup>

Interestingly, New Zealand's recent Outer Space and High-Altitude Activities Act of 2017<sup>37</sup>, draws some inspiration from the above list. In its purposes section, the law declares that its purposes, among others, are to "*implement certain international obligations of New Zealand relating to space activities and space technology*" and "without limiting [the above purpose], implement obligations" in OST Art. IV.<sup>38</sup> Thus, in the purposes section of New Zealand's law, the only OST obligations receiving highlighting and specific recognition are the OST Art. IV arms control provisions. However, greater detail is given in the New Zealand laws' provisions specifically detailing licenses for launches and permits for payloads. For example, with respect to launches, the Minister can only grant a license "if the Minister is satisfied that ....(d) the proposed launch or launches under the license are *consistent with New Zealand's international obligations....*"<sup>39</sup> The Act then imposes the following requirements on launch licensees:

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36 See Schaefer, *supra* note 3, pp. 152-153 (additionally showing that the space station visits provisions of OST Art. XII and astronaut assistance provisions of OST Art. V. are unlikely to implicate private entities either because the object and purpose of the provision at issue in the case of Art. XII or because of lack of technical feasibility in the case of Art. V).

37 New Zealand Outer Space and High-Altitude Activities Act of 2017, available at <http://www.legislation.govt.nz/act/public/2017/0029/latest/DLM6966275.html>.

38 *Id.*, Sec. 3(b)(c).

39 *Id.*, Sec. 9(1)(d).

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- (i) conduct the launch and operations in a manner that—
- (ii) *minimizes the risk of contamination of outer space or adverse changes in the earth’s environment*; and
- (iii) *takes into account the activities of others in the use of outer space*; and
- (iv) *is consistent with New Zealand’s international obligations*; and
- (v) *avoids harmful interference* with outer space and terrestrial radiocommunications; and
- (vi) comply with any other conditions that the Minister considers necessary or desirable in order to—
- (vii) *give effect to New Zealand’s international obligations*; or
- (viii) protect national security or other national interests; or
- (ix) ensure public safety; or
- (x) *avoid potentially harmful interference with the activities of others in the peaceful exploration and use of outer space*; or
- (xi) *minimise the risk of contamination of outer space or adverse changes in the earth’s environment*; or
- (xii) manage New Zealand’s potential liability under international law (including under the Liability Convention and the Outer Space Treaty).<sup>40</sup>

The provisions covering payload permits are analogous to those covering launch licensing.<sup>41</sup> While OST Art. IX obligations dealing with “harmful contamination,” “harmful interference,” and “due regard” (or in the New Zealand Act’s language “take into account the activities of others in the use of outer space”) are certainly subject to some interpretative ambiguity in specific applications, the listing of them in the law and subsequent application of them in specific license scenarios can assist in developing a coalescence of views among countries – or at least make more clear the fault lines in any disagreement – thereby assisting diplomatic efforts within COPUOS or elsewhere. Such level of detail certainly provides more than the minimal and imperfect harmonization that exists currently that focuses only on the need to comply with the OST, or international obligations generally, with no further specification of what OST obligations encompass in terms of private party activity.

Some other national space legislation enacted over the past several decades also includes elaboration of more detailed OST obligations. For example, Austria’s 2011 space law lists as a condition for authorization that the

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40 *Id.*, Sec. 10(g) & (i).

41 *Id.*, Sec. 17(c) & 18(d) &(f).

activity “does not run counter to ...*Austria’s obligations under international law...*”<sup>42</sup> However, it also goes on to list as a condition of authorization that “*the space activity does not cause harmful contamination of outer space or adverse changes in the environment,*” largely borrowing language directly from OST Art. IX.<sup>43</sup> In addition to attempts to implement OST Art. IV obligations, the national space laws of Ukraine and Russia also contain either direct prohibitions on harmful contamination of outer space or violating norms on pollution in outer space.<sup>44</sup>

Thus, New Zealand’s law is not the first to go beyond general calls to comply with international obligations and include reference to specific OST obligations. However, the New Zealand law’s list of OST obligations that might impact commercial space activities tracks most closely and faithfully the OST’s text compared to the earlier attempts of Ukraine and Russia in their national space legislation (realizing English language translation might influence this determination as well), and the New Zealand law’s list is obviously more comprehensive than Austrian law’s mention of one specific OST obligation.

#### 4. Conclusion

A low-level of imperfect harmonization exists in national space legislation currently, whereby many countries require compliance with the OST, often by reference to conformity with international obligations generally, as a condition to licensing or authorizing commercial space activities. That some harmonization exists is unsurprising given that OST Art. VI requires countries to authorize and provide continuing supervision of private space activities, in part to provide assurance that their commercial operators act in conformity with the OST. However, the minimal level of harmonization in national space law regarding compliance with the OST, often times achieved only by reference to international obligations generally, does not provide significant transparency benefits to private parties, nor does it help advance a coalescence of views around OST obligations. More detail in national space legislation regarding what the OST requires may assist diplomacy within the UN Committee on Peaceful Uses of Outer Space (COPUOS) and in other forums that seeks a greater coalescence of views on the specifics of OST

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42 Austrian Federal Law on the Authorisation of Space Activities and the Establishment of a National Space Registry (Austrian Outer Space Act, adopted by the National Council on 6 December 2011, entered into force on 28 December 2011), Sec. 4(3), available on UNOOSA web site.

43 See *id.*, Sec. 4(5).

44 See *supra* note 33.

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requirements. More detail may also provide enhanced transparency and certainty to private parties and confirm that OST obligations are minimally burdensome for commercial entities, thereby advancing and stimulating innovation and investment by commercial entities in the space sector.