

Kiwi's in Space

New Zealand's 'Outer Space and High-Altitude Activities Act'

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Abstract

The number of countries with more or less comprehensive national space legislation addressing in particular the authorization and supervision of private space activities continues to grow, and several more countries are currently in the process of adding themselves to that list. One of the more recent ones amongst them is New Zealand, which has an extensive 'Outer Space and High-altitude Activities Act' that is to enter into force in December 2017.

The paper briefly recaps the general underlying international obligations, in particular as following from Articles VI, VII and VIII of the Outer Space Treaty, the Liability Convention and the Registration Convention, New Zealand being a party to the first two but not the third. It then proceeds to analyse the Bill from the above perspective. It will compare the legislation *in statu nascendi* as needed or helpful with other national space laws already pronounced on those issues, including that of its neighbour Australia which has a national space law in place since 1998, and in doing so will take New Zealand's policies in the field into consideration. This will finally allow for some conclusions as to the contribution to the further development of (international and national) space law represented by these legislative efforts on the part of New Zealand.

1. Introduction

At the time of writing, New Zealand's Outer Space and High-altitude Activities Act is scheduled to enter into force on 21 December 2017.¹ Depending upon one's precise definition of a national space law, New Zealand thus belongs to the first twenty or so countries having enunciated more or less comprehensive frameworks for domestically regulating private space activities, notably by providing for a licensing system of some sort.

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1 Outer Space and High-altitude Activities Act 2017 (hereafter New Zealand Space Act); Public Act 2017 No. 29, date of assent 10 July 2017.

Following the general approach in summarily analysing such national space laws taken amongst others by the present author,² this paper will focus on the international responsibility and liability for New Zealand pursuant to Articles VI and VII of the Outer Space Treaty³ and the Liability Convention⁴ and the exercise of national jurisdiction *inter alia* pursuant to Article VIII of the Outer Space Treaty and the Registration Convention.⁵ In addition, it will

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- 2 See I. Marboe, National space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 127-204; also the author's various articles on individual national space laws: The Swedish and British Space Acts and Private Commercial Enterprise under Public International Law, *Memoria, Conferencia Espacial de las Americas* (1991), 336-42; South Africa in Space: the New Space Affairs Act of 1993, 23 *Journal of Space Law* (1995), 195-7; Two New National Space Laws: Russia and South Africa, in *Proceedings of the Thirty-Eighth Colloquium on the Law of Outer Space* (1996), 251-61; Launching from "Down Under": The New Australian Space Activities Act of 1998, in *Proceedings of the Forty-Third Colloquium on the Law of Outer Space* (2001), 132-41; Ukrainian national space law from an international perspective, 18 *Space Policy* (2002), 15-23, with S.A. Negoda; Vikings First in National Space Law: Other Europeans to Follow – The Continuing Story Of National Implementation Of International Responsibility And Liability, in *Proceedings of the Forty-Fourth Colloquium on the Law of Outer Space* (2002), 111-21, with A. Nikolaisen; Launching Alcantara into the global space economy – The 2001 Brazilian national space law, in *Proceedings of the Forty-Fifth Colloquium on the Law of Outer Space* (2003), 310-20; Implementing the United Nations Outer Space Treaties – The Case of the Netherlands, in *Proceedings of the Forty-Seventh Colloquium on the Law of Outer Space* (2005), 139-45; Another Addition to National Space Legislation: The Austrian Outer Space Act, Adopted 6 December 2011, in *Proceedings of the International Institute of Space Law 2012* (2013), 643-54; and The Second African National Space Law: The Nigerian NASRDA Act and The Draft Regulations On Licensing And Supervision, in *Proceedings of the International Institute of Space Law 2016* (2017), 547-59.
- 3 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereafter Outer Space Treaty), London/Moscow/ Washington, done 27 January 1967, entered into force 10 October 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967).
New Zealand ratified the Outer Space Treaty on 21 May 1968; see www.treaties.mfat.govt.nz/search/details/t/662; last visited 1 August 2017.
- 4 Convention on International Liability for Damage Caused by Space Objects (hereafter Liability Convention), London/ Moscow/Washington, done 29 March 1972, entered into force 1 September 1972; 961 UNTS 187; TIAS 7762; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965 (1971).
New Zealand ratified the Liability Convention on 30 October 1974; see www.treaties.mfat.govt.nz/search/details/t/699; last visited 1 August 2017.
- 5 Convention on Registration of Objects Launched into Outer Space (hereafter Registration Convention), New York, done 14 January 1975, entered into force 15 September 1976; 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43 (1975).

address in some detail the most outstanding novel aspect of the New Zealand Space Act, which is the inclusion of high-altitude activities in its scope.

2. General Approach of the New Zealand Space Act

To start with the latter, this particular aspect of the New Zealand Space Act is already referenced by the title: it covers not only ‘space activities’, a category of activities so far hardly defined with precision in international space law (or in many national space laws for that matter), but also ‘high-altitude activities’.

The Act does in principle purport to address the “regulation of space activities” without further qualification⁶ and to “manage any potential or actual liability that may arise from the space industry”,⁷ and refers to the need to “implement certain international obligations of New Zealand relating to space activities and space technology”⁸ – all in non-limitative terms. However, the establishment of the Act seems to have been triggered in particular by a first private launch performed by Rocket Lab from a private launch site in New Zealand in May 2017.⁹

In this regard, the Act reflects the same dual purpose as the US Commercial Space Launch Act:¹⁰ not only to *regulate* (for purposes of safety and other public interests), but also to “*facilitate* the development of a space industry”.¹¹

Next, ‘high altitude’ is defined as the higher of being above flight level 600, effectively 60,000 feet (= some 18 km) and being above the highest upper limit of controlled airspace (currently established usually at 9,500 feet (= some 2.9 km).¹² In addition to thus leaving the lower limit of ‘high altitude’ flexible, the Act does not provide for any upper limit of the areas designated

New Zealand is not a party to, yet currently in the process of adhering to the Registration Convention; see www.treaties.mfat.govt.nz/search/details/p/196; last visited 17 November 2017. Moreover, since the Registration Convention is largely considered to be an elaboration of Article VIII of the Outer Space Treaty (see e.g. F.G. von der Dunk, International space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 94, and references cited), it might in general terms already as of the present have legal implications for New Zealand.

6 Sec. 3(e), New Zealand Space Act. Note also that Sec. 3(c) addresses military uses of outer space, not a domain normally involving any private space endeavours.

7 Sec. 3(d), New Zealand Space Act.

8 Sec. 3(b), New Zealand Space Act.

9 See www.spacedaily.com/reports/Successful_launch_puts_New_Zealand_in_space_race_999.html; last visited 22 August 2017.

10 Cf. Secs. 50902, 50903, 51 U.S.C.

11 Sec. 3(a), New Zealand Space Act (emphasis added).

12 See Sec. 4, 9th term, New Zealand Space Act; cf. further NZANR – Part 71 – Controlled Airspace (CTA); [www.aip.net.nz/pdf/NZANR_Part_71_Controlled_Airspace_\(CTA\).pdf](http://www.aip.net.nz/pdf/NZANR_Part_71_Controlled_Airspace_(CTA).pdf); last visited 17 November 2017.

‘high altitude’, and since ‘outer space’ is not defined in the Act either, it leaves the question wide open at which point New Zealand’s airspace vertically speaking is considered to give way to the international realm of outer space.

Phrased differently: the inclusion in the New Zealand Space Act of high-altitude activities, taking place above the realm where ‘normal’ aviation takes place, allows for circumventing the conundrum other countries have faced when addressing the question of whether to delimit airspace and outer space – most notably, of course, the Kiwis’ big neighbour Australia¹³ – whilst being able to address commercial space launches, in particular for ‘space tourist’ purposes, in a seemingly coherent manner. To achieve a similar result, for instance the United States had to take the approach to define a ‘launch vehicle’ as being “*built to operate in (...) outer space*”,¹⁴ which allowed also certain high-altitude operations to be covered by the Commercial Space Launch Act as long as conducted *in the context of* developing vehicles which would ultimately go into outer space.

Unfortunately, however, upon closer view the New Zealand solution merely shifts the problems concerning the appropriate legal regime(s) which (should) address private commercial space launches. In line with the above partial definition of ‘high altitude’, a ‘high-altitude payload’ is defined as an object intended to be placed in the realm above (currently) 18 km without any specified upper limit and without excluding outer space either implicitly or explicitly.¹⁵

At the same time, however, a ‘space object’, constituting a major trigger of application of space law, is essentially defined as something (intended to be) launched into ‘outer space’, without any exclusion of objects already defined as high-altitude payloads.¹⁶ Thus, the confusion on this issue is not solved as all space objects would automatically also qualify as high-altitude payloads, whereas the reverse obviously is not necessarily true.

Further complications arise following the introduction of a third category of ‘objects’ potentially involved in high-altitude activities. The Act includes the definition of ‘aircraft’ of the New Zealand Civil Aviation Act, which reiterates the international definition found in the Annexes to the Chicago Convention: “any machine that can derive support in the atmosphere from

13 Australia amended its 1998 Space Activities Act in 2002 to take the 100 km altitude-line as the effective upper limit of exercise of territorial jurisdiction for the purpose of the Act; see Sec. 8, 16th, 21st, 33rd & 35th bullets, An act about space activities, and for related purposes (hereafter Australian Space Activities Act), No. 123 of 1998, assented to 21 December 1998; as amended by amending legislation up to No. 100 of 2002.

14 Sec. 50902(8)(B), 51 U.S.C. (emphasis added).

15 See Sec. 4, 11th term, New Zealand Space Act.

16 See Sec. 4, 31th term, New Zealand Space Act.

the reactions of the air otherwise than by the reactions of the air against the surface of the earth".¹⁷ Again, no clarity is provided as to how this concept relates to the other two, in particular that of 'space object' – the latter, after all, also includes its launch vehicle¹⁸ which could at the same time well be an aircraft.

Thus, while the definition of 'space object' in the New Zealand Space Act naturally had to be geared towards the half-baked, partly circular definition ruling in the Liability Convention,¹⁹ the possibility to contribute to more clarity has not been made use of. At best, the definition already generally accepted by experts, as including anything (intended to be) launched into outer space, has been reinforced.²⁰

'Launch' moreover is defined as "(i) causing to take-off or depart; or (ii) releasing" including attempts to do so,²¹ thus reinforcing the notion that it essentially comprises every technology intended to move an object into high altitudes and/or outer space (as the concept of 'launch' – in contrast to that of 'launch vehicle'²² – does not refer to any specific realm or altitude).

The result now is a hybrid regime whereby some operations at altitudes above normal aviation operations, depending on the vehicle used and/or other parameters, may effectively qualify as both high-altitude activities and

17 Sec. 2(1), 12th term, Civil Aviation Act 1990; Public Act 1990 No. 98, date of assent 8 August 1990; see also Annex 7 to the Convention on International Civil Aviation (hereafter Chicago Convention), Chicago, done 7 December 1944, entered into force 4 April 1947; 15 UNTS 295; TIAS 1591; 61 Stat. 1180; Cmd. 6614; UKTS 1953 No. 8; ATS 1957 No. 5; ICAO Doc. 7300, Aircraft nationality and registration marks, 5th edition, July 2003, Definitions; Annex 8, Airworthiness of aircraft, 10th edition, April 2005, Definitions.

18 See Art. I(d), Liability Convention.

19 Art. I(d), Liability Convention, provides: "The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof."

Sec. 4, 31st term, New Zealand Space Act, provides that "space object (...) means– (a) a launch vehicle that is launched, or is intended to be launched, into outer space; or (b) a payload that is carried or launched, or intended to be carried or launched, by a launch vehicle into outer space; or (c) the launch vehicle and the payload (if any) carried by the launch vehicle; or (d) any component part of the launch vehicle or payload, even if– (i) the part does not reach, or is not intended to reach, outer space; or (ii) the part results from separation of a payload or payloads from a launch vehicle after launch".

20 See e.g. F.G. von der Dunk, International space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 86-7; cf. also M. Lachs, *The Law of Outer Space* (reprint 2010), 65-7; L.J. Smith & A. Kerrest de Rozavel, The 1972 Convention on International Liability for Damage Caused by Space Objects, in *Cologne Commentary on Space Law* (Eds. S. Hobe, B. Schmidt-Tedd & K.U. Schrogl) Vol. II (2013), 114-5; S. Gorove, Issues Pertaining to the Legal Definition 'Space Object', 2 *Telecommunications and Space Journal* (1995), 136-45.

21 Sec. 4, 14th term, New Zealand Space Act.

22 See Sec. 4, 17th term, New Zealand Space Act.

as space activities whereas others may only qualify as high-altitude activities, without any clear dividing line between the two and/or between the application to them of respective legal regimes.

3. International Responsibility for Space Activities

Article VI of the Outer Space Treaty not only made New Zealand responsible for “national activities in space”, but also required its government to ensure “authorization and continuing supervision” of such activities if undertaken by private (“non-governmental”) entities, preferably (but not necessarily) by way of a national licensing regime. The phrase ‘activities in space’ confirms the relevance of determining where that area begins, and the unfortunate absence of any clarification in the New Zealand Space Act on that issue as discussed.

As regularly discussed elsewhere,²³ in the context of domestic interpretation and implementation of Article VI, this state responsibility however also gives rise to two main further questions: what scope *ratione materiae*, that is with reference to the categories of ‘activities’ in space to be licensed, and what scope *ratione personae/ratione geographiae*, that is with regard to the categories of non-governmental entities conducting ‘national’ activities to be licensed, have respective national space laws opted for?

As to the scope *ratione materiae*, the New Zealand Space Act indeed for all intents and purposes addresses space *launch* activities. New Zealand first followed the example of such other countries as notably the United States²⁴ and Australia²⁵ in separating the licensing of space launches from the licensing of spaceport operations. Sections 38–44 of the New Zealand Space Act provide for a facility license required to operate a launch facility, defined as “a facility (whether fixed or mobile) or place from which it is intended to launch a launch vehicle”,²⁶ thus encompassing also air launches such as Virgin Galactic is planning to conduct.

The licensing of space launches is then, somewhat inspired possibly by the Australian example but following a different approach, further subdivided into four types of license: (1) the launch license, for launching a launch vehicle from New Zealand;²⁷ (2) the overseas launch license, required in case a launch vehicle is to be launched by a New Zealand national, including a

23 See e.g. F.G. von der Dunk, International space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk) (2015), 53-4.

24 Cf. Sec. 50904(a), 51 U.S.C.

25 Cf. Secs. 11–14 resp. 15, Australian Space Activities Act.

26 Sec. 4, 15th term, New Zealand Space Act.

27 See Secs. 7–14, New Zealand Space Act. Cf. Secs. 11, 26–34, Australian Space Activities Act.

company with New Zealand nationality, from outside the country;²⁸ (3) the payload permit, in case a payload is to be launched from New Zealand;²⁹ and (4) the overseas payload permit in case a payload procured or launched by a New Zealand national is to be launched from outside New Zealand.³⁰

In sum, in spite of the reference to ‘space activities’ in the title and the definition of the Act’s purposes by Section 3, the licensing regime by way of these five types of licenses *ratione materiae* focuses very much on launching activities only, whereby other categories of space activities such as satellite communications and satellite remote sensing are only addressed through payload licensing in the context of such launches. The furthest detail in which the New Zealand Space Act goes in this last respect is to reference the applicability alternatively absence thereof of the Radio Communications Act 1989 in the context of a payload permit.³¹

On the other hand, the delineation of the scope of the attendant licensing obligations does not unequivocally address *space* activities only. Note for instance that Section 7 on the launch license more in detail defines the scope *ratione geographiae* to comprise launches undertaken “from a launch facility in New Zealand, or from a vehicle in the air that was launched from New Zealand”. The use of the term ‘launch’ is confusing in the second part of that phrase, as the definition of ‘launching vehicle’ (a term used in the following clause) refers to “outer space”³² although the definition of ‘launch’ does not.³³

Ratione personae/ratione geographiae, the licensing obligation applies to relevant activities both conducted from New Zealand territory, including its airspace, and conducted elsewhere by New Zealand nationals (at least in principle), noting again that this seems largely confined to launch activities

28 See Secs. 23–30, resp. 4, 21st term *sub* (b), New Zealand Space Act. Cf. Secs. 12, 35–41, Australian Space Activities Act.

29 See Secs. 15–22, New Zealand Space Act. Note that ‘payload’ is defined as essentially “an object that is carried or placed, or is intended to be carried or placed, *in outer space*”; Sec. 4, 24th term (emphasis added). Note also that the requirement to obtain a payload permit extends to the ‘procurement’ of the launch of that payload, presumably referring to the applicability of Article VII – as opposed to Article VI – of the Outer Space Treaty and the Liability Convention to such procurement for the purposes of liability; see Art. I(c)(i), Liability Convention.

30 See Secs. 31–37, New Zealand Space Act. Note again that the requirement to obtain an overseas payload permit also extends to the ‘procurement’ of the launch of that payload by a New Zealand national, presumably referring to the applicability of Article VII – as opposed to Article VI – of the Outer Space Treaty and the Liability Convention to such procurement for the purposes of liability; see Art. I(c)(i), Liability Convention.

31 See Sec. 22, New Zealand Space Act.

32 Sec. 4, 17th term, New Zealand Space Act.

33 See Sec. 4, 14th bullet, New Zealand Space Act.

themselves.³⁴ In other words, whether consciously or not, the term ‘national’ in the concept of ‘national activities in space’ of Article VI of the Outer Space Treaty is interpreted as essentially referring to both activities conducted from national territory and activities conducted by nationals, including companies.³⁵ Only with respect to the operation of launch facilities, the facility license *ratione geographiae* is limited in scope to those persons or companies intending to undertake those activities in New Zealand.³⁶

4. International Responsibility for High-Altitude Activities

Then, of course, there is the unique Subpart of the New Zealand Space Act which addresses high-altitude activities by way of high-altitude licences. It should be noted that, pursuant to international law, any responsibility to license such activities does not come from *space* law, notably Article VI of the Outer Space Treaty since this Article focuses on activities *in outer space*. As far as launches are concerned, this means Article VI covers only (intended or actual) launches into outer space, not launches towards or other activities conducted at high altitudes yet *not* in outer space.

Rather, any international responsibility here would spring from the more general responsibility of a state not to allow its territory in a legal sense (thus including its airspace as the realm ‘below’ outer space) to be used for activities harmful to other states,³⁷ as well as a much more specific reference

34 See Secs. 7, 15(1), resp. 23, 34(1), New Zealand Space Act. Note that Sec. 51 allows the responsible Minister to accept a foreign license to replace a license under the New Zealand Space Act if “satisfying some or all of the criteria” for granting such a latter license.

Sec. 4, 21st term, New Zealand Space Act defines a New Zealand national as “(a) a New Zealand citizen or permanent resident of New Zealand; (b) a body corporate established by or under the law of New Zealand”.

35 Cf. e.g. F.G. von der Dunk, International space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 53-4; M. Gerhard, Article VI, in *Cologne Commentary on Space Law* (Eds. S. Hobe, B. Schmidt-Tedd & K.U. Schrogl) Vol. I (2009), 112-4; A. Kerrest de Rozavel, Remarks on the Responsibility and Liability, in *Proceedings of the Fortieth Colloquium on the Law of Outer Space* (1998), 139; V. Kayser, An Achievement of Domestic Law: U.S. Regulation of Private Commercial Launch Services, 17 *Annals of Air and Space Law* (1991), 341-3; B. Cheng, *Studies in International Space Law* (1997), 658-63.

36 See Sec. 38, New Zealand Space Act. The Australian Space Activities Act has the same scope *ratione personae/ratione geographiae* (see Sec. 18); the US Commercial Space Launch Act however also applies the relevant licensing obligations to nationals intending to operate such facilities outside the United States (see Sec. 50904(a)(2) & (3), 51 U.S.C.).

37 See e.g. R.M.M. Wallace, *International Law* (3rd ed.)(1997), 196-7; A. Cassese, *International Law* (2001), 381; and the general maxim of public international law ‘*sic utere tuo ut alienum non laedas*’.

to aviation safety, whereby a state is considered responsible for the safety of aviation in its own sovereign airspace.³⁸

Unless already covered by a launch license as discussed earlier, “[a] person must not launch a high-altitude vehicle from New Zealand, or from a vehicle in the air that was launched from New Zealand, unless the person has a high-altitude licence for the launch”.³⁹ The dividing line between a launch license and a high-altitude license is then taken care of as the launch license applies to the use of a ‘launch vehicle’, which is defined with reference to outer space,⁴⁰ whereas the high-altitude license applies only in case no launch license has been granted.⁴¹

However, in the absence of any determination of where outer space begins or where the area referenced as ‘high-altitude’ ends, as discussed before, one is still left in the dark as to which of the two mutually exclusive licenses should be at stake in any given case – when does a vehicle become a launch vehicle for the purpose of a launch license, respectively when does it not qualify as such, hence would be subject to a high-altitude license?

Then, a high-altitude license is linked to the use of a ‘high-altitude vehicle’, which is defined as “an aircraft or any other vehicle that travels, is intended to travel, or is capable of travelling to high altitude”.⁴² That definition still does not tell us at what point an altitude would be so high as to constitute outer space and no longer give rise to the label ‘high-altitude vehicle’.

While the definition of ‘aircraft’ in turn is rather precise, also per the New Zealand Space Act as referring to the Civil Aviation Act and the Chicago Convention, the reference to ‘any other vehicle’ again begs the question as to what altitude constitutes ‘high altitude’ without amounting to being in outer space, if we are to separate launch vehicles subject to a launch license from high-altitude vehicles other than aircraft subject to a high-altitude license.

If possibilities would ever arise for private manned sub-orbital flights from New Zealand, this would raise further issues: some of the vehicles currently on the drawing table would easily qualify as aircraft, whereas others would clearly not so qualify.⁴³

The two categories of licenses enjoy major similarities, such as with respect to the main requirements relating to technical capabilities, management of risks with respect to public safety, and compliance with the international

38 Cf. Arts. 1, 12, 28, Chicago Convention; see further e.g. W. Schwenk & R. Schwenk, *Aspects of International Co-operation in Air Traffic Management* (1998), 3 ff.

39 Sec. 45(1), New Zealand Space Act; further subsec. (2).

40 See Sec. 7, New Zealand Space Act, *juncto* Sec. 4, 17th term.

41 As per Sec. 45(2), New Zealand Space Act.

42 Sec. 4, 12th term, *juncto* Sec. 45(1), New Zealand Space Act.

43 See e.g. F.G. von der Dunk, *The integrated approach—Regulating private human spaceflight as space activity, aircraft operation, and high-risk adventure tourism*, 92 *Acta Astronautica* (2013), 199-208.

obligations of New Zealand.⁴⁴ However there are also major differences between the two, the most outstanding one in this respect being that the launch license includes an orbital debris mitigation plan,⁴⁵ indicating that this license is indeed addressing potential orbiting operations.

While that may seem a useful dividing line – orbits are almost by definition in outer space – on closer view unfortunately it is not. Sub-orbital spaceflights *also* by definition enter outer space (however exactly defined), even if only marginally and certainly not for a full orbit or more. Not to mention that several private operators are about to realize on a commercial basis space launch opportunities into orbit, *inter alia* to service the International Space Station.⁴⁶ It would therefore effectively be a fallacy to think that a reference to orbital operations defines outer space in an unequivocal manner and would thus solve the conundrum of whether suborbital flights are to be addressed by air law or by space law (or both).⁴⁷

5. International Liability in the Context of Space Activities

With Article VII of the Outer Space Treaty as further elaborated by the Liability Convention providing for state liability at the international level also in case the damage is due to private space activities, handling such state liability *vis-à-vis* domestic operators has been a major element of most national licensing systems.⁴⁸ This is no different for the New Zealand Space Act, which lists as one of its main purposes to “manage any potential or actual liability that may arise from the space industry”.⁴⁹

Indeed, all five types of space licenses include a near-identical clause allowing the responsible Minister to impose conditions to “manage New Zealand’s potential liability under international law (including under the Liability Convention and the Outer Space Treaty)”, which may require a licensee “to indemnify the [state] in whole or in part against– (a) any claim brought against the [state] under the Liability Convention or the Outer Space Treaty; or (b) any other claim brought against the [state] under international law in relation to an act or omission of the licensee under this Act”.⁵⁰

44 See Secs. 9(1) resp. 47(1)(a), New Zealand Space Act.

45 See Sec. 9(1)(c), New Zealand Space Act.

46 See F.G. von der Dunk, Legal aspects of private manned spaceflight, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 664-5, 697 ff.

47 See also e.g. F.G. von der Dunk, The integrated approach–Regulating private human spaceflight as space activity, aircraft operation, and high-risk adventure tourism, 92 *Acta Astronautica* (2013), 199-208.

48 See e.g. I. Marboe, National space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk)(2015), 137-9.

49 Sec. 3(d), New Zealand Space Act.

50 Sec. 10((1)(i)(vi) & (3), New Zealand Space Act for the launch license; cf. also Sec. 18(1)(f)(vi) & (2)(a) for the payload permit, Sec. 26(1)(e)(vi) & (3) for the overseas

Keeping the range of existing national space laws in other countries in mind, this approach gives rise to four fundamental remarks.

First, the derogation of any state liability arising pursuant to international space law by the government to a licensee is not automatic as per the law itself; it is an *option* for the responsible Minister to impose such an obligation as per the license or permit. This is noteworthy, as most other countries with a national space law have opted for either mandatory derogation clauses in the license,⁵¹ or at least for such clauses by way of default option, allowing the government to *not* impose the derogation obligation only under specific circumstances.⁵²

Second, whereas most states then add an obligation to take out insurance at least up to some level against third-party liability including such as arising under international space law,⁵³ the New Zealand Space Act as such is silent on that issue, apparently leaving it again to the discretion of the responsible Minister to include such an obligation in any specific license.

Third, as logically following from the above, unlike some other leading spacefaring nations which have quoted or at least indicated maxima to either the reimbursement obligation or the mandatory insurance cover,⁵⁴ the New Zealand Space Act is completely silent on this point as well. In short: no particular guidance is given at the outset on what any prospective licensee or permittee might reasonably expect in terms of derogation and insurance obligations.

Fourth, it is interesting to note that the phrases on liability do not only cover the Liability Convention and Article VII of the Outer Space Treaty, which are the clauses explicitly referencing 'liability' in the context of space activities,

launch license, Sec. 34(1)(e)(i) & (2)(a) for the overseas payload permit, and Sec. 41(2) for the facility license (the first phrase concerning general conditions is missing here, but subsec. (2) ensures that the net result of any liability incurred on the part of New Zealand could still be arranged along the same lines).

51 Cf. e.g. for the United States, Sec. 50914, 51 U.S.C.; Secs. 74–75, Australian Space Activities Act; and for France, Arts. 13–14, *Loi relative aux opérations spatiales* (hereafter French Law on Space Operations); *Loi n° 2008-518 du 3 juin 2008*; unofficial English version 34 *Journal of Space Law* (2008), 453.

52 Cf. e.g. the case of Sweden, where Sec. 6, Act on Space Activities, 1982: 963, 18 November 1982; *National Space Legislation of the World*, Vol. I (2001), at 398; *Space Law – Basic Legal Documents*, E.II.1; 36 *Zeitschrift für Luft- und Weltraumrecht* (1987), 11; provides: “If the Swedish State on account of undertakings in international agreements has been liable for damage which has come about as a result of space activities carried on by persons who have carried on the space activity shall reimburse the State what has been disbursed on account of the above-mentioned undertakings, *unless special reasons tell against this.*” Emphasis added.

53 Cf. e.g. for the United States, Sec. 50914, 51 U.S.C.; Sec. 48, Australian Space Activities Act; and Art. 6, French Law on Space Operations.

54 Cf. e.g. for the United States, Sec. 50914, 51 U.S.C.; Sec. 48(3), Australian Space Activities Act; and Arts. 15–17, French Law on Space Operations.

but also refer to the Outer Space Treaty as such and even more broadly to “any other claim (...) under international law”.⁵⁵ Apparently, this takes care also of the possibilities for international claims to arise for compensation of damage not pursuant to the Liability Convention (or Article VII of the Outer Space Treaty) but pursuant to Article VI of the Outer Space Treaty, noting the fundamentally different system of attribution under either.

The latter Article, even if it normally refers to ‘responsibility’ only, would not necessarily exclude claims for damage arising in the context of a violation of international space law. Whereas Article VII and the Liability Convention would give rise to liability for the launching state(s) of a space object causing such damage, Article VI could well allow in the alternative or in addition for claims against states whose ‘national activities in outer space’ would be accountable for such damage, since reparation for a violation of an international obligation may well entail material compensation in case material damage is involved in such violation.⁵⁶

In this respect the phrasing of the New Zealand Space Act represents a welcome precision of the legal options to handle damage caused by space activities, not just limiting itself to the Liability Convention but clearly allowing other bases for claims for compensation to be entertained as well.

6. International Liability in the Context of High-Altitude Activities

As for the high-altitude licenses, the applicable Subpart does not at all refer to liability, let alone to liability specifically in the context of the Liability Convention and/or the Outer Space Treaty. Reference here is only made to general compliance with the Civil Aviation Act 1990 “and any regulations and rules made under that Act”.⁵⁷ One may assume this includes specific liability-related regulations and rules, both at a domestic level and at an international level as applicable.⁵⁸

Specifically added here is the option for the responsible Minister to include insurance-related obligations of any sort in the licensing conditions.⁵⁹ So, contrary to the space licenses, in the context of high-altitude licenses the issue of insurance *has* been addressed at least at some level, suggesting that the omission of any such reference in the context of space licenses is a matter of policy rather than oversight.

55 *E.g.* Sec. 10(3)(b), New Zealand Space Act (for the launch license).

56 For more details on this discussion see *e.g.* F.G. von der Dunk, International space law, in *Handbook of Space Law* (Ed. F.G. von der Dunk) (2015), 50-5.

57 Sec. 48(1)(e), New Zealand Space Act.

58 As to the international level, since New Zealand is not a party to the few international conventions addressing third-party liability for damage caused by aviation on the ground, national tort law would apply.

59 See Sec. 48(2), New Zealand Space Act.

This confirms the earlier conclusion that presumably the dividing line between a launch license or payload permit on the one hand and a high-altitude license on the other is the use of a space object in the former context (since that is what triggers the applicability of the Liability Convention) respectively of an aircraft in the latter context.

In the absence however of any indication of where New Zealand considers outer space to begin, and hence of what constitutes a space object as defined with reference to the intention to launch it into outer space,⁶⁰ one is still left with uncertainty as to where the precise dividing line between the 'other vehicles' than aircraft potentially involved in high-altitude activities and space objects for the purpose of the Act and its various licenses and permits would be.

Until now, such an absence of a precise definition and delimitation may not have given rise to many problems in practice; but precisely with the advent of sub-orbital private space launches, which supposedly has driven the development of the Act, this *is* becoming an issue of importance. At least the operators of sub-orbital *tourist* flights themselves claim to be entering outer space by achieving altitudes of 100 km, and selling their customers an astronaut experience.

7. The Registration Issue

The dichotomy between space objects and aircraft addressed above also plays out in the realm of registration. At the highest level, the differences may seem minor. Under air law, registration provides the nationality of the flag state to the aircraft and hence the possibility to exercise quasi-territorial jurisdiction over it and any persons on board.⁶¹ Under space law, registration of a space object does *not* formally provide for its nationality – but *still* provides the registration state with the possibility to exercise quasi-territorial jurisdiction over it and any persons on board.⁶²

However, when it comes to the details, huge differences do arise. Registration of aircraft entails a major suite of obligations on the part of the state of registration, such as ensuring appropriate certification of airworthiness and licensing of personnel.⁶³ The intricate and extended details, continuously updated moreover so as to make aviation the safe mode of transport it currently is, are found in such Annexes to the Chicago Convention as Annex

60 See Sec. 4, 31st term, New Zealand Space Act.

61 *Cf.* Art. 17, Chicago Convention; also *e.g.* Art. 3, Convention on Offences and Certain Other Acts Committed on Board Aircraft, Tokyo, done 14 September 1963, entered into force 4 December 1969; 704 UNTS 219; TIAS 6768; UKTS 1969 No. 126; Cmnd. 2261; ATS 1970 No. 14; 2 ILM 1042 (1963); ICAO Doc. 8364.

62 *Cf.* Art. VIII, Outer Space Treaty *juncto* Art. II, Registration Convention.

63 See Arts. 31, 32, Chicago Convention.

8 on Airworthiness of aircraft and Annex 1 on Personnel licensing, which by dint of Articles 37 and 38 of the Chicago Convention are in principle binding upon states in their entirety.

By contrast, registration of a space object entails the requirement only of providing a fairly limited set of items of information concerning the space object, such as its intended orbital trajectory, date of launch and general purpose; a requirement which moreover is caveated by “as soon as practicable”⁶⁴ – and in practice is far from scrupulously complied with.⁶⁵

It is thus important to note that under the four space-related licenses, essentially the conditions referred to by the Registration Convention are to be complied with and the relevant information is to be provided by the licensee.⁶⁶ Although New Zealand is not a party (yet) to the Registration Convention, and no reference in the context of licensing is therefore actually made to that Convention, it is clear that New Zealand is assuming the vehicles to be involved to be space objects – in particular if unmanned as opposed to aircraft – and is already applying the rules of the Convention at least on this point, whether in anticipation of the adherence to that Convention, or in recognition of the fact that already the Liability Convention (to which New Zealand *is* a party) is triggered by the involvement of a space object, which is moreover defined in exactly the same way as under the Registration Convention.⁶⁷

By contrast, in the Subpart on high-altitude activity licensing the references to orbital parameters are conspicuously absent, while on the other hand only some general reference is made to information concerning the ‘launch’ to be provided – interestingly, including information on the intended range of altitudes.⁶⁸ In the absence of any formal indication of the altitude at which New Zealand would consider high-altitude activities to become space activities, this seems to provide the authorities with the flexibility to address these issues as they arise. The disadvantage of this flexibility, however, would be a major lack of legal certainty upfront, all the more in the absence of any established set of criteria determining the outcome in particular case.

Furthermore, the reference to the Civil Aviation Act 1990 includes the reference to the registration-related articles of that Act.⁶⁹ These, however,

64 Cf. Art. IV(1), Registration Convention.

65 See already Y. Lee, Registration of Space Objects: ESA Member States’ Practice, 22 *Space Policy* (2006), 42-51.

66 See Sec. 10(1)(a), New Zealand Space Act, for the launch license; Sec. 18(1)(a) for the payload permit; Sec. 26(1)(a) for the overseas launch license; and Sec. 34(1)(a) for the overseas payload permit.

67 See Art. I(d), Liability Convention, resp. Art. I(b), Registration Convention.

68 Cf. Sec. 48(1)(a), New Zealand Space Act.

69 See Sec. 48(1)(e), New Zealand Space Act *juncto* esp. Sec. 6, Civil Aviation Act.

would only apply to aircraft involved in high-altitude activities, presumably not to the 'other vehicles' potentially involved therein.

Once more, the lack of clarity as to whether the dichotomy between space-related licenses and licenses for high-altitude activities equates with the dichotomy between space objects and aircraft, or whether it equates with a different set of altitudes, makes for a fairly complex and confusing result here.

8. Concluding Remarks

In view of the detailed and extended nature of the Act, covering 93 Articles and 53 pages, of necessity the current analysis focused on a few higher, overarching elements of responsibility, liability, registration and jurisdiction only.

Without therefore detracting from the value and validity of many precise and accurate clauses further offered by the New Zealand Space Act, such as on security and space debris or the safety assessment and enforcement provisions, at the level of conceptual analysis offered above it should already be clear that the laudable efforts to solve the conundrum regarding how to legislate and regulate private commercial space launches, in particular those of a sub-orbital nature, backfire, as a consequence of problems in offering helpful, consistent and logical definitions of some of the key terms on which the Act and its application would hinge.

While part of that is the unfortunate consequence of the absence in large measure of helpful, consistent and logical definitions on the international level – which is obviously the first set of parameters which New Zealand would have to comply with – by the same token the Act has omitted to make use of the opportunities concurrently arising to help clarify these terms at least for the benefit of the New Zealand space industry and others possibly seeking out the country to do business in, which would seem to be the primary motive for the Act in the first place.

