

A New Approach to National Laws Aimed at Encouraging Small Satellites' Space Activities

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1. Introduction

An increasing number of actors, both public and private, developing and emerging countries,¹ start-ups and large companies, are engaging in space activities. This trend reflects the acknowledgment of the central role that outer space plays in addressing national and global challenges and contributing to sustainable development.²

The privatisation and commercialisation of outer space³ is one of the most relevant trends in this area, pushed by R&D, technological breakthroughs that decrease the cost of space activities – such as small satellites and reusable rockets⁴ – and the encouragement States give to the development of a robust space private sector.

It so happens, however, that space activities are ruled by a set of international provisions designed at a time of public led activities undertaken by a limited number of countries. On the other hand, space activities involve relevant risks for both outer space and the Earth. These two vectors have led to the approval of national space laws that aim to address, at the national level, the obligations of States under the international space provisions and the risks

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1 See, *inter alia*, Robert C. Harding, *Space Policy in Developing Countries, The search for security and development on the final frontier*, Routledge (2013).

2 See Alexander Soucek, *Space and sustainability: improving life on Earth*, Christian Brunner Alexander Soucek, *Outer Space in Society, Politics and Law*, Springer, 569-603 (2011).

3 See, on this issue, *inter alia*, Edith Walter, *The privatisation and commercialisation of outer space*, Christian Brunner Alexander Soucek, *Outer Space in Society, Politics and Law*, Springer, 493-518 (2011).

4 Such as, for instance, small satellites and reusable launching vehicles. On this issue, e.g., the *United Nations Programme on Space Applications*, UNOOSA, at <http://www.unoosa.org/pdf/publications/ST_SPACE_52_Rev1.pdf>, expressly indicating that “a decrease in the cost of space products and ancillary equipment has contributed to the growth in the number of space actors in the developing world, integrating space capabilities into their national development programmes”.

arising from such activities. But, if the development of a robust private sector in this field is a goal pursued by States, then national space laws – as well as other applicable frameworks – must be able to also promote private activity. This paper addresses how national legal and regulatory frameworks can be designed to respond to the needs of private space activities without compromising international commitments and the peaceful uses of outer space, taking into special attention the advent of small satellites.

2. Private Space Activities and Space Treaties

The Space Treaties – the Outer Space Treaty (OST),⁵ the Rescue Agreement,⁶ the Registration Convention,⁷ the Liability Convention⁸ and the Moon Agreement⁹ – contain the basic international framework for outer space activities.

Because they were drafted at a time when space activities were a public endeavour, their provisions are directed at States, even when acknowledging that non-State activity could be or become a reality.

For purposes of this paper, we highlight the three most relevant points:

- Firstly, the provision that the activities of non-governmental entities' in space require authorization and continuing supervision by the appropriate State (Article VI of the OST);
- Secondly, the provision that States are internationally liable for the damages caused by space activities (Article VII of the OST and Liability Convention); and
- Thirdly, the provision stating the obligation of States to register space objects (Article VIII of the OST and Registration Convention).

With the emergence of private activities, compliance with the above obligations requires that the private sector also abides by them. Indeed,

5 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 (entered into force on 10 October 1967) [OST].

6 *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, 22 April 1968, 672 U.N.T.S. 119, 19 U.S.T. 7570, T.I.A.S. No. 6599, 7 I.L.M. 151.

7 *Convention on Registration of Objects Launched into Outer Space*, 14 January 1975, 1023 U.N.T.S. 15, 28 U.S.T. 695, T.I.A.S. No. 8480, 14 I.L.M. 43.

8 *Convention on the International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 U.N.T.S. 187, 24 U.S.T. 2389, T.I.A.S. No 7762.

9 *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 5 December 1979, 1363 U.N.T.S. 3, 18 I.L.M. 1434.

national laws are crucial to reflect the requirements of the Space Treaties at the domestic level.¹⁰

But, because they are not the recipients of the Space Treaties, this was soon recognised as requiring national laws to be approved for this effect. In this respect, it is important to note UNGA Resolution n. 59/115,¹¹ which recommends that States performing space activities enact national laws authorizing and setting forth supervision of space activities of non-governmental entities falling under their jurisdiction. On its turn, UNGA Resolution n. 68/74¹² contains recommendations on national legislation for the peaceful use of outer space.

Hence, private space activities are outside the direct scope of the Space Treaties. This, despite seeming to be a constraint, can be looked through different lenses: it has given States the flexibility to draft and update laws that respond to the evolution of space activities whilst continuing to respect international provisions. This is important in the light of the persistent evolution of technology, products and services in this area (of which small satellites and constellation of satellites are good examples), as well as in the light of the increasing difficulty in approving or updating international provisions given the large number of countries that are space actors today.

On the other hand, though it could be argued that this flexibility leads to the approval of laws that on its turn may lead to “forum shopping”¹³ (i.e., laws that aim to attract the private sector to a country in detriment of others), it seems to be at least reasonable to think that international provisions that were to apply also to private actors could not engage in the level of detail that national laws can. And it is this space left open by the Treaties that can be successfully used to encourage private activity and create the right environment for such phenomena as small satellites.

In sum, because the Space Treaties apply only to States, there is the need to extend their framework to the new private space actors, which can only be done (lacking the feasibility of reviewing the international framework) at the

10 On the discussion of whether the Outer Space Treaty imposes on States the obligation to approve national laws, see J. Hermida, *Legal Basis for a National Space Legislation*, Kluwer Academic Publishers (2004), at 28-32. See also A. Kerrest de Rozavel, *The Need to Implement the Outer Space Treaty through National Law in the Light of the Current and Foreseeable Space Activity*, Proceedings of the International Institute of Space Law 2010 (2011).

11 UNGA Resolution n. 59/115, of 10 December 2004: Application of the concept of the “launching State”, point 1.

12 Resolution n. 68/74, of 11 December 2013: Recommendations on national legislation relevant to the peaceful exploration and use of outer space.

13 Highlighting that the difference in national space frameworks is an obstacle to the creation of a level playing field in the space sector, leading to “flags of convenience” or “forum shopping”, see I. Marboe, *National Space Law*, F. von der Dunk, F. Tronchetti, Handbook of Space Law, Edward Elgar Publishing (2015) [Marboe], at 128.

national level.¹⁴ On the other hand, space laws are also relevant instruments to encourage private activity.¹⁵

Hence, national laws play two very important roles: firstly, they respond to the obligations set out in the Space Treaties. Secondly, national laws can be used to promote private space activities in a given jurisdiction, by means of approving legal provisions that facilitate and/or protect private actors.

It is this last role that is the focus of this paper: how a national legal framework can be designed to encourage private activity, especially small satellites' space activities.

3. The Role of National Laws in Private Space Activities

The analysis of the role of national laws in private space activities covers three main sections:

- Section III.1 briefly analyses what is the most appropriate national approach to outer space considering the features and goals of the country. Highlight will be made of non-traditional approaches, such as the ones of Luxembourg and the Isle of Man.
- Section III.2 analyses to what extent a more comprehensive legal framework that goes beyond strict space laws is relevant for the promotion of private activities.
- Section III.3 investigates different approaches to national space laws and which ones are more conducive to private space activities.
- Section III.4 briefly describes the solutions adopted by the Portuguese Space Act to encourage private activity, including specifically small satellites.

3.1 National approaches to space activities

In order to determine the role of national laws in private space activities – especially how they can be designed to promote private activities –, one shall start by looking, first, at the general approach a country can take when dealing with the private space sector.

In this scope, it is useful to distinguish two broad manners under which space activities can be promoted.

The first one is the traditional approach, whereby the development of space activities is led by the State. In this case, the State usually approves a space policy and/or strategy as well as space laws. It further becomes part of the Space Treaties (usually leaving the Moon Treaty behind). In addition, it sets

14 F. Tronchetti, *Fundamentals of Space Law and Policy*, Springer (2013), at 26.

15 On the benefits of attracting private space activities, see D. Linden, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization*, JSPG. Vol. 8, Issue 1 (2016), at 2.

up a space agency – which performs space activities – and a space authority – which monitors space activities. Sometimes these entities are one and the same. In this approach, it is the State that takes the leadership role in promoting private space activities, and thus sets up the objectives and timelines in this regard.

The second approach is a non-traditional one, whereby the focus of the State is very much on empowering private actors to take the leadership in space activities. In this case, the State approves policies that are not strictly space policies but rather measures for promotion of space activities (e.g., tax, IP, state funds for R&D). The State further sets up an agency (such as an innovation agency) for assisting private actors, and promotes the development of clusters and networks. This approach is noticeably the one taken by Luxembourg¹⁶ and the Isle of Man.¹⁷

Luxembourg's approach has been very much based on promoting private space activities through support programmes (LuxLaunch, LuxIMPULSE, LuxYGT and Luxembourg Space Fund)), assisting companies through the national innovation agency (Luxinnovation), promoting clusters (Space Cluster and GLAE – Groupement Luxembourgeois de l'Aéronautique et de l'Espace), incubators and research centers. Luxembourg started its innovative path in space through SES (satellite operator) and continues today with a law for the exploration and use of space resources.¹⁸

The Isle of Man has space clusters and groups such as the Space Industry Group and the Aerospace Cluster, a regulatory framework favorable to private activities (e.g., there is no income tax over the income of space operators nor over insurance premiums), the exploration of orbital slots is done through a PPP model by ManSat Ltd., and the island is marketed as “Space Isle”.

But a non-traditional approach has also been adopted in other countries or regions, such as Bermuda, Gibraltar, Cyprus, Malta or Tonga. These countries' approach is very much focused on certain more limited space areas, especially on the allocation of orbital slots.¹⁹

The non-traditional approach seems, at first, to be the most industry-friendly. However, it is important to make two notes.

Firstly, a traditional approach can also – and it is usually – accompanied by measures aimed at encouraging private activity. Indeed, in current times of privatisation and commercialisation of space activities, even when the State leads the investment in outer space, it does so having the private sector in

16 See <https://spaceresources.public.lu/en.html>.

17 *Innovative Strategies for Space Competitiveness: Assessing the SpaceIsle's Policy and Results*, Futron Corporation (2011).

18 Space Resources Act, Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace [Law of July, 20 2017 on the Exploration and Use of Space Resources], Mémorial A, n° 674, July 28th 2017, art. 1 (Lux.).

19 See also *supra* note 17, at 15-18.

mind. This is not only a trend in developed countries,²⁰ but even in emerging countries giving their first steps in outer space.²¹

Secondly, the traditional approach – to the extent it does reflect the trends and goals of private space activities – has the benefit of clearly identifying the approach, priorities and main objectives of a State in space endeavours, and can, for that reason, lead to more predictability and security for private actors. It is important to note in this scope that Luxembourg itself has established a space agency (focused primarily on building up the country's space industry, education and workforce development) and it is also in the process of approving a space law to cover space activities beyond space mining.²²

In any case, and regardless of the above, the approach to be taken very much depends upon the features, needs and goals of the State. There is no “one size fits all” when it comes to approaches to space endeavours: space, as an instrument to achieve general and sectoral development objectives of countries, needs to be integrated in such objectives and take into consideration possible constraints (e.g., financial, human resources) if it wishes to be successful.

Despite what was said, one thing seems certain: the increase of space activities, the advent of small satellites and the decreasing costs of space operations, all advise the adoption of measures that promote, or at least do not hinder, private activity.

These can translate, firstly, in the creation of an agency aimed at encouraging private activity (or allocation of these duties to an existing agency), as well as of clusters, networks and stimulus measures. The creation of an outer space platform that brings together and encourages regular dialogue among all relevant stakeholders (companies, researchers / educational institutions, public entities and civil society) should also be considered. Such platform would have the added benefit of permitting laws and policies to be regularly discussed and improved as needed in light of the new developments and needs in the space sector.

All of the above could be laid down so as to guarantee that it is the private sector that takes the leadership in discussing, proposing and bringing forward regular innovative measures that are effective in taking advantage of all the benefits of outer space.

20 For instance, Portugal approved a Space Strategy 2030 by Resolution of Council of Ministers 30/2018, of 12 March, establishing the main pillars of State investment in outer space.

21 For instance, Angolan Presidential Decree n. 85/17 of 10th May, approved the Space Strategy of the Republic of Angola 2016-2025. The Angolan state has also launched a telecommunications satellite – Angosat-1, which is being replaced by Angosat-2 due to technical problems of the former.

22 *Projet de Loi n. 7317 sur les activités spatiales et portant modification de la loi modifiée du 9 juillet 1937 sur l'impôt sur les assurances.*

Hence, and in sum, promotion of private activity at the national level requires giving to private actors the leadership or co-leadership (with the State) in developing new approaches and policies for space activities.

3.2. A complete framework promoting private activity

The promotion of private space activity requires something more than strict space policies and laws. We have just seen above how Luxembourg and the Isle of Man have used financial, tax and insurance incentives, as well as public-private partnerships, to encourage private activity.

Indeed, if a State wishes to promote private space activities, it should also look at other legal regimes, such as tax, intellectual property, import/export controls and environmental law.

For example, space actors, especially new entrants, could be exempted or benefit from lower taxes with relation to the proceeds generated from space activities, for a certain period of time. Registry of intellectual property arising from space activities and space R&D could also be free of charge. Import and export controls could be revisited or reinterpreted when dealing with space assets (especially the ones bearing less risks²³), in order to avoid burdensome provisions whilst at the same time guaranteeing that the dual-use nature of most space assets is taken into consideration in line with international obligations.²⁴ And compliance with environmental laws should lead to the promotion of research aimed at encouraging environmental sound space activities.

In addition to the above, it is important to remember that launching satellites into orbit requires the assignment of orbital slots to private actors. States should approve clear and simple procedures for orbital slots in line with ITU procedures.²⁵

What is more, the fees to be paid for the authorization and for the orbital slots should bear in mind the goal of promoting space activities, whilst at the same time they should naturally also be a source of revenue for the State. Given the increasing number of new entrants, including start-ups and scale-ups, in the outer space field, the establishment of different fees according to the size of the space actor, and/or exempting them from the payment of

23 On this issue as relates to small satellites, C. D. Johnson, *Legal and Regulatory Considerations of Small Satellite Projects*, Secure World Foundation [Johnson], at 21-23.

24 Especially (i) the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies, Wassenaar, 19 December 1995, effective 12 July 1996 and (ii) the Missile Technology Control Regime. See, at the EU level, Council Regulation (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items, as well as Directive 2009/43/EC of the European Parliament and of the Council of 6 May 2009 simplifying terms and conditions of transfers of defence-related products within the Community.

25 See, inter alia, for a brief description, R. L. Spencer, Jr., *International Space Law: A Basis for National Regulation*, Ram S. Jakhu, *National Regulation of Space Activities*, Springer (2010), at 13-17.

fees for a certain period of time (in case of periodic fees) could also be considered.

An institutional framework that would facilitate the licensing of the space activity could also be put in place, under which the space operator would be able to have one single interlocutor for all issues necessary (especially for the space activity, the orbital slot and occupation of air space during launches and returns).

Hence, and in sum, promotion of private activity at the national level requires the approval of a broader legal framework that, despite not being strict space law, has impacts on space activities.

3.3. Space laws – models for encouraging private activity, including small satellites

The proposals made above for encouraging private activity represent important steps without which a State may become less competitive than it could with relation to attracting the private space sector.

However, one very central element is, naturally, how space laws address private activities. We refer, in this scope, to space laws that aim at regulating space activities consisting of launching, operation²⁶ and return of space objects²⁷— and that, thus, are the ones reflecting the scope of the Space Treaties.

Two major paths can be proposed or identified hereunder.

The first one pertains to national laws that are especially concerned with transposing to the country's legal framework the obligations arising from the Space Treaties. There are the laws that contain provisions mirroring the provisions of the Space Treaties (which we will call, for simplicity, as “traditional space laws”). Those provisions are essentially the ones on authorization, supervision, registration and liability.²⁸ In a very brief manner:

- National authorization provisions establish that space activities shall be authorized. The provisions usually contain the procedure for

26 Operation and control means any basic control of the object, including telemetry, tracking, or control commands, as well as using such objects for satellite telecommunications, remote sensing, or other applications. Johnson, *supra* note 23, at 17.

27 Some States extend the scope of their respective laws to other space activities, such as development of space technology. I. Marboe & F. Hafner, *Brief Overview over National Authorization Mechanisms in Implementation of the UN International Space Treaties*, F. von der Dunk, National Space Legislation in Europe, Issues of Authorisation of Private Space Activities in the light of Developments in European Space Cooperation, Koninklijke Brill NV, Leiden, The Netherlands (2011) [*Marboe Hafner*], at 57. We suggest limiting them to the activities indicated to prevent additional burdens on private operators.

28 See the *Sofia Guidelines for a Model Law on National Space Legislation of the International Law Association (ILA)*, UNCOPUOS, Legal Subcommittee, 52nd Session, 2013, A/AC.105/C.2/2013/CRP.6.

authorization, including the requirements the applicant and the space activity shall meet, as well as information / documentation to be submitted.²⁹

- Supervision provisions usually establish the right of the competent entity to monitor space activities, including by means of performing inspections and requiring the submission of information;
- Registration provisions usually require the registration of the space object in accordance with international obligations – so that the State can then submit the registration to the UN;
- Liability provisions indicate that any liability the State may incur at the international level shall be borne by the entity carrying out the space activity. It is common for the State to bear some part of the liability especially if there is no fault by the space actor,³⁰ as well as to require insurance.³¹

Traditional space laws do a good job of guaranteeing that the basics of the Space Treaties apply to all space actors. In addition, they are an important instrument for States to be able to comply with their international obligations (such as on authorization, supervision and registration). Lastly, they also protect States in light of their international obligations (such as in the case of liability).

However, traditional space laws are insufficient to respond to the growth of private space activities. They are further insufficient to respond to the new trends in space activities, such as the advent of small satellites, of reusable launchers or of suborbital flights. For instance, the requirement that authorization shall be granted for each space operation (e.g., a launch of a satellite) does not seem to be appropriate for the launch of constellations of small satellites. In another example, the lack of distinction between the payload and the launcher leads to the same launcher having to be authorized as many times as each payload it carries. This is clear when the “space

29 For example, technical and financial capability, safety of people and property, protection of the environment and public order, and space debris mitigation. See Marboe Hafner, *supra* note 27, at 63.

30 For example, under French Law (Law 2008-518 in respect of space operations) [*French Law*], the French State has a right of recourse against operators. The right of recourse is subject to limitations save in the event of wilful misconduct of the operator. The UK Outer Space Act 1986 [*UK Outer Space Act 1986*] also establishes a liability cap, which is of up to 60,000,000 pounds.

31 On insurance, see, inter alia, C. Gaubert, *Insurance in the Context of National Authorisation*, F. von der Dunk, National Space Legislation in Europe, Issues of Authorisation of Private Space Activities in the light of Developments in European Space Cooperation, Koninklijke Brill NV, Leiden, The Netherlands, 164-177 (2011).

object” is defined as “including the launch vehicle”,³² meaning that each authorization procedure for each payload needs to describe the launcher. Likewise, traditional space laws do not usually cover the mere landing of reusable launchers.³³ On the other hand, they usually do not cover suborbital flights,³⁴ leaving the question of whether this activity shall be ruled by space law, air law or a specific regime unanswered³⁵.

Traditional space laws are also inadequate to promote private space activities when they create burdens that are difficult to comply with by new entrants (e.g., complex and lengthy procedures, amounts of insurance that disregard the actual risk of the space operation, lack of distinction between commercial activities and scientific or testing activities).

It is clear, therefore, that traditional space laws are not fully suitable to respond to and promote private space activities.

Therefore, another path is required in this scope: the one where national space laws take advantage of the open space left by the Space Treaties and use it to create a regime that encourages private activity whilst continuing to comply with the applicable international requirements and obligations.

The promotion of private activities through the legal framework on outer space requires, therefore, that several traditional elements of space laws be addressed in a different manner. We will focus essentially on the following elements: scope, authorization, liability and insurance.

With relation to scope, it is common for space laws to apply to private actors that are established in the country or that perform space activities in the country.

Note that Article VI of the OST indicates that “the appropriate State” is responsible for national activities in outer space.³⁶ In addition, UNGA Resolution 59/115³⁷ requires that the State authorizes and supervises space

32 See, for example, the 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) [*Austrian Law*].

33 For instance, the UK Outer Space Act 1986, *supra* note 30, covers only the launch and operation of a space object, whereas the Space Industry Act 2018 [*UK Space Industry Act*], in addition to those, also covers the return of a space object or a vehicle containing a space object. This is so because only this last Act covers space activities performed in the UK territory. French Law (*supra* note 30) also covers the return of space objects.

34 The UK Space Industry Act, *supra* note 33, covers however suborbital flights. The US, differently, approved a special regime under its Commercial Space Launch Amendments Act. See R. Moro-Aguilar, *National Regulation of Private Suborbital Flights: A Fresh View*, *FIU Law Review*, Vol. 10, n. 2 (2015).

35 This issue, however, will not be analysed in this paper, which therefore does not cover suborbital flights.

36 On the concept of “appropriate state” see *Marboe*, *supra* note 13, at 133-139.

37 *Supra* note 11.

activities carried out by non-governmental entities under its jurisdiction. Many national laws³⁸ have interpreted these requirements as entailing that the national law should apply to both activities carried out in their territory (including, in some cases, vessels and aircraft), as well as to national entities even if the space activity is carried out abroad.³⁹ This creates a burden on the space actor, because, as a result, the space actor becomes subject to more than one domestic law: the one of the place of establishment and the one where the space activity is carried out.

This constraint can be addressed by different routes: under the first one, the space law may decide to apply only to activities carried out in the territory of the country.⁴⁰ This approach would be very effective in addressing the above constraint⁴¹ and it has indeed been adopted in some jurisdictions.⁴² However, it may raise risks for the State, especially in case of liability: indeed, the State could still be considered internationally liable for the activities of such entity (in accordance with the criteria of the launching State in the Liability Convention⁴³) but then it would not have the right to require from that entity the compensation paid because the law would not apply to such entity. Hence, it has been correctly pointed out that:

38 This is the case of, for example, of the French Law, *supra* note 30. The UK adopted the same approach through its UK Space Industry Act, *supra* note 33. In accordance with this framework, the UK Outer Space Act 1986, *supra* note 30, shall apply to activities carried out by UK nationals abroad, while the UK Space Industry Act shall apply to space and suborbital activities carried out within the country's territory.

39 J.F. Mayence, *Granting Access to Outer Space: Rights and Responsibilities for States and their Citizens, An Alternative Approach to Article VI of the Outer Space Treaty, Notably Through the Belgian Space Legislation*, F. von der Dunk, National Space Legislation in Europe, Issues of Authorisation of Private Space Activities in the light of Developments in European Space Cooperation, Koninklijke Brill NV, Leiden, The Netherlands (2011), at 82-83 [*Mayence*]. Also Marboe Hafner, *supra* note 27, at 59-61.

40 See, seemingly defending that national laws have the power to decide on this issue, F. von der Dunk, *The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law*, F. von der Dunk, National Space Legislation in Europe, Issues of Authorisation of Private Space Activities in the light of Developments in European Space Cooperation, Koninklijke Brill NV, Leiden, The Netherlands (2011) [*Dunk*], at 18: "All states that have taken up the issue of authorizing national private space activities (however defined) have, explicitly or implicitly, considered themselves to be the 'appropriate State' for precisely doing so".

41 Defending this view, Mayence, *supra* note 39, at 87.

42 See, e.g., the example of Belgium. Indeed, Belgium Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects [*Belgium Law*] establishes that the law covers the activities of launching, flight operations and guidance of space objects carried out by natural or legal persons in the zones placed under the jurisdiction or control of the Belgian State or using installations, personal or real property, owned by the Belgian State or which are under its jurisdiction or its control.

43 Liability Convention, *supra* note 8, article I.

If states are interested in covering, through their authorization regimes, also the possible liability they may incur [...] as a consequence of private space [...] activities, they would better establish an authorization regime that does not only apply to such activities conducted in their territory, but also to such activities conducted by their nationals regardless of where that takes place.⁴⁴

On the other hand, one must be reminded that the application of the law to national activities (even if carried out by a foreign entity) may have practical implementation restrictions: for example, enforcement of supervision powers or of liability provisions is not straightforward for foreign entities. This could be addressed by requiring that all entities performing a space activity in a given jurisdiction would have to set up an establishment in such jurisdiction. However, this may in practice create additional burdens to private activity.

The second route would be the one where the law creates mechanisms to avoid or mitigate the burdens arising from the application of more than one national law.

One such mechanism could be the one where national entities were excluded from the law if the activities were performed in a country (or countries) with national space laws substantially similar to those of the first country and with which the first country had an international agreement with reciprocity.⁴⁵ Under such agreement, the second country (i.e., the country in whose territory the space activity takes place) would assume before the first country (i.e., the country of the space actor) the obligation to comply with the international obligations on space matters, and the first country would assume the obligation to cooperate with the second country in the discharge of its obligations (e.g., performing audits or enforcing liability).

Another such mechanism would be the one where authorization procedure for national entities that carry out space activities abroad is simplified (e.g., the delivery to the national authority of the authorization obtained from the foreign country could be sufficient). All the rest (supervision, registration, liability) would remain the same.

The second issue that national space laws shall address to promote private activities is authorization. There are three main points that we wish to address in this scope: first, the types of authorization; second, the object of the authorization; and thirdly the requirements for the authorization.

With regards to types of authorization, we recall that authorisation per space operation may in practice be very burdensome in the light of activities such as constellations of satellites. Hence, alongside authorization per space

44 Dunk, *supra* note 40, at 24.

45 For example, under the UK Outer Space Act 1986, *supra* note 30, the license may be waived with respect to activities covered by agreements between the United Kingdom and other countries whereby the country's international obligations are already ensured.

operation, blanket licenses could be issued for constellations of satellites bearing the same characteristics.⁴⁶ These blanket licenses could be issued for a certain number of satellites or for a certain period of time. Blanket licenses would go a long way in simplifying the process for obtaining authorizations and effectively respond to the recent trends in space activities.⁴⁷

With relation to the object of the authorization, we suggest that further analysis is undertaken to assess the feasibility of subjecting each space object (satellite, launcher) to authorization.⁴⁸ We recall that many domestic laws, following the definitions of space object contained in the Liability and Registration Conventions, consider that a space object includes its launch vehicle.⁴⁹ This means that it is the payload that is subject to authorization. Hence, the authorization procedure shall detail the characteristics of this broad concept of space object (i.e., of the payload – satellite – and the launcher). This approach, however, disregards the fact that the same launcher can be used for several payloads and for several launches (reusable launch vehicles) and can be also used without payload (e.g., testing purposes). Therefore, we suggest that both the payload and the launcher could be subject to separate authorizations.

In order to avoid the multiplication of authorizations, some options could be put forward. For instance, the authorization could apply only to the space object that would be an end in itself, thus excluding a space object that is a tool/instrument for another one: e.g., a launcher being tested would be an end in itself; a launcher carrying satellites would be an instrument for placing the satellites on orbit; a launcher returning to Earth would be an end in itself. Hence, in the first case, the launcher would require an authorization (for launching, operation and possibly return); in the second case only the satellites would require authorization (for launching and operation, such authorization to cover the conditions of the launcher), and in the third case the launcher would require a return authorization.

46 Against, arguing that a licence for every object launched should continue to be issued “simply because when you have, say, 200 satellites, and one fails and is withdrawn from the constellation, you need a way of managing the licensing issues around it”, the position of the UK Space Agency on the UK Spaceflight Bill, available at <<https://publications.parliament.uk/pa/cm201617/cmsselect/cmsstech/1070/107006.htm>>.

47 This type of license has been discussed in other countries particularly for small satellites / satellite constellations, but most laws yet do not expressly adopt this model. However, for example, Belgian Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects [*Belgian Law*], indicates that it is possible to authorize various space objects.

48 See the example of Australia: here, separate licenses are needed for the launch facility, for the launch vehicle and for the launch of a particular space object. Marboe Hafner, *supra* note 27, at 56.

49 Differently, Belgian Law, *supra* note 47, distinguishes the space object to be launched and any device whose purpose is to launch it.

Another option would be to subject each space object (satellite / launcher) to authorization, but each of them to different kinds of authorizations: for example, the launcher would be the one that had to have a launching and return authorization, and the satellite would need only an operation authorization (in which case, hence, simply procuring a launch would be excluded from scope). In order to fully promote private space activities, the law could permit one single authorization procedure to take place for a related space operation. In such a case, one of the space actors involved in the operation would obtain all the needed authorizations for itself and on behalf of the other space actors.

In addition, to further simplify the authorization procedure, the national law could indicate that the information relating to a launcher that had already been authorized would not have to be submitted again, thus streamlining the authorization process.⁵⁰ Alternatively, the law could create a “certification” of launchers. This “certification” would confirm that the launcher would meet certain required criteria. Every time a certified launcher would be used, it would suffice to refer to that certification in the authorization procedure for the payload.

Finally, the requirements for the authorization could also be used to promote private activities in light of the perceived risks and of the kind of space actor at stake: for example, non-profit R&D space activities could be subject to a different type of procedure, universities or research centres could be exempt from certain requirements and the launch of small satellites with lower risks could benefit from a quicker procedure.

Liability and insurance is another point where national laws can be used in furtherance of private space activities.⁵¹ Most laws already establish that, if a State is considered internationally liable, it has the right of recourse against the private actor – such right of recourse capped so as to encourage private activity. But, in many cases, the cap is not applicable: e.g., if the private actor acted with fault.⁵² However, some laws exclude the cap only if the private actor acted intentionally, meaning that in all other cases it continues to

50 See the French Ordinance relating to the technical regulation of authorizations (*Arrêté du 31 mars 2011 relatif à la réfection technique en application du décret n° 2009-643 du 9 juin 2009 relatif aux autorisations délivrées en application de la loi n° 2008-518 du 3 juin 2008 relative aux opérations spatiales*), under which the satellite operator is released from the obligation to submit technical information for the launch if the launch operator is licensed.

51 For purposes of this paper, we assume that a State is liable for the private activities to which it is responsible for. Hence, we are not analyzing the discussions had on this matter.

52 For instance, French Law, *supra* note 30, article 13, and Austrian Law, *supra* note 32, § 11 (2).

benefit from the cap⁵³ – this is a clear means of encouraging private activity and thus giving more comfort to private stakeholders.

But, moreover, in addition to the State bearing part of the liability of the space actor, the national law can also establish the direct liability of the private entity and allow this entity to then act against the State to require the payment of the part of the liability that the State is willing to bear. Indeed, we recall that article XI of the Liability Convention expressly indicates that a victim may pursue a claim in the courts of the launching State and such claims may naturally be addressed to private operators.⁵⁴ Hence, the mere establishment of the right of recourse of the State against the private operator for a part of the compensation paid may not suffice: it is also necessary to establish the same rule in benefit of the private operator itself.

In addition, insurance could be lower or even waived in certain situations (e.g., if the risks of the operation are low).⁵⁵

All of the above suggestions could effectively contribute to make space laws friendlier to private space endeavours. However, they should naturally be evaluated in light of the needs, goals and characteristics of each State.

Take, for example, a developing country with lower human and material resources that does not expect to have a space port and is only now beginning its path to outer space. In this case, the State may want to invest in national R&D and capacity building in space matters. It may further want to promote international partnerships for building and launching satellites. In such a case, it would make sense to apply the domestic law to national entities carrying out space operations abroad but implement a simplified procedure in this case (e.g., delivery of the authorization obtained abroad would suffice). For activities taking place in the territory (e.g., the operation of the satellite), it would also make sense to create a more simplified process

53 French Law, *supra* note 30.

54 A. Kerrest de Rozavel & F.G. von der Dunk, *Liability and Insurance in the Context of National Authorisation*, F. von der Dunk, National Space Legislation in Europe, Issues of Authorisation of Private Space Activities in the light of Developments in European Space Cooperation, Koninklijke Brill NV, Leiden, The Netherlands (2011), at 128-129.

55 For instance, in France, *supra* note 30, insurance is required to cover the risks inherent to the activity, in accordance with the criteria and conditions defined by decree of the State's Council, and the State should be one of the beneficiaries. However, it is possible to establish conditions for an operator to be released from the insurance obligation by decree.

In Austria, *supra* note 32, minimum insurance required is 60 million Euros but the authority may allow a lower threshold or exempt any public-interest activities from insurance, taking account of the risks inherent to the activity and the operator's financial capacity (public-interest activities include activities performed in the service of science, investigation and education).

In the United Kingdom, the required insurance amount is not set forth in the law, but usually amounts to 60 million pounds.

for authorizations to R&D purposes. On the other hand, waiving insurance requirements might not be advisable if the State would be unable to pay compensation to third parties in case of damage caused by the space object. However, the partnership agreements with foreign entities could address this issue, whereby such foreign entities would get the insurance for the whole operation and hence national entities could be exempted.

Take, on the other hand, a space power with fully developed private activities. In this case, lowering and even exempting insurance requirements in certain cases would perhaps be doable. But a more simplified process for R&D might not be in general advisable to the extent such R&D would carry more risks than typical run-of-the-mill activities. Indeed, it would be more plausible that R&D in a space power would be a fully innovative risk-bearing activity than in a developing country where it most probably would focus on capacity building.

Hence, the promotion of private activities through domestic space laws needs to strike a proper balance between this objective and the effective means the State has at its disposal for achieving this goal. Once again, one size does not fit all. It is thus each State's duty, when designing space laws, to assess the best and more feasible means to boost private space activities.

3.4. The Portuguese Space Act

The Portuguese Space Act – Decree-Law n. 16/2019, of 22 January⁵⁶ –, enshrines several innovative solutions that will go a long way to promote private space activities in the country.

Indeed, in addition to ensuring that space activities comply with international principles on the use of outer space, notably peaceful use, the Act aims also at accommodating the goal of increasing private space activity in Portugal and of developing R&D in this sector.

The Act applies to “space activities”, which include “space operations” (which, on its turn, are of two types: “launch and/or return” and “command and control” of “space objects”) and launch sites' operations. Note, in this respect, that reference to launch sites' is made only with the purpose of allowing launch sites to be pre-qualified – which, as it will be seen below, is a mechanism to streamline authorisation of space operations.

The Act also adopts a definition of space object that distinguishes between the payload and the launcher: a space object is (i) any object launched or intended to be launched into space, notably to be placed in orbit or launched beyond the earth's orbit, (ii) any launching object even if used unloaded, such as for test purposes (“launcher”), and (iii) any component of the above.

Only space operations are subject to license – i.e., “launch and/or return”; “command and control”. The license may be individual – for each type of operation – or blanket – for a set of operations of the same type. It is also

⁵⁶ Decree-Law n. 16/2019, of 22 January, Official Journal n. 15/2019, 1st Series.

possible to issue a joint/combined license, whereas a space operator can obtain a license for itself and on behalf of other operators for operations of the same or of different type, further streamlining the licensing procedure.

A special procedure (reduction of deadlines, streamlined requirements for the performance of the activity) may be established (i) if the space activity is solely for scientific, research or education purposes, or for testing purposes which carry low risks, (ii) if the applicant is a public entity or an international organisation acting under international agreements concluded by Portugal, or (iii) if the applicant has obtained authorisation for the space operation in another State whose legal framework guarantees the compliance of the applicable international obligations. Note that the Act also allows a space actor carrying out space activities abroad to be exempted from a license where it shows that it has obtained a license, and complies with the laws, in a country with which Portugal concluded an international agreement that guarantees compliance by Portugal of its international obligations.

In addition to the license, the Act creates a voluntary pre-qualification regime. Pre-qualification certifies:

- That the operators possess the technical, economic and financial capacity for the space operations they intend to perform;
- For the launch sites, that the systems and processes implemented respect applicable law and comply with the requirements set out in technical regulation approved by the Space Authority;
- For the space object, the features and specifications;
- For the command and control, the systems and processes implemented at the command and control centre.

The pre-qualification procedure is aimed at facilitating the issue of licenses, in that the information required to be submitted in respect of matters already certified under the pre-qualification procedure does not need to be resubmitted prior to the issue of each license.

It is also important to note that the Act establishes that the Space Authority is a one-stop shop for all licenses required for the space operation, i.e., not only the license under the Space Act, but others such as nuclear, environmental, airspace.

On the other hand, note also that the requirements for obtaining a license include, among others, that (i) the space operation duly safeguards any damages to Earth or to space, in accordance with applicable national and international commitments; (ii) the space operation ensures the minimisation of space debris as much as possible, in accordance with international principles and standards and (iii) the space operation complies with applicable public security standards and does not endanger public health and the safety of populations. In addition, the applicant shall have the technical,

economic and financial capacity for the space activities it intends to carry out. These provisions aim at guaranteeing the sustainability of space activity and outer space also in line with international requirements and concerns.

The liability regime follows, in general, best international practice whereas the operators' liability is capped in the case of the right of recourse being brought by the State. The amounts of the cap are not indicated – a future Order will determine them and it seems to be possible to foresee different caps, likely in accordance with the risk of the operation.

The Act provides for mandatory insurance but allows the insured amount to be decreased and even waived in certain instances by Order: small space objects; space operations carried out exclusively for scientific, research or education purposes; if the operator submits another financial guarantee as allowed by the Order and accepted by the Space Authority; by and other operations that demonstrably carry low risks as determined by the Space Authority on a case by case basis.

The Act then contains the remainder usual provisions on space laws, including: registration (in accordance with Portugal's international obligations – however, additional registration obligations are foreseen in the following cases: space objects whose launch, return or command/control are done by licensed operators; transfer of the space object; end of life of the space object; incident suffered by the space object), supervision and the penalty regime (which is limited to administrative offences punished with fines, and ancillary penalties: inhibition in performing space activities and suspension of license).

Note that full application of the Act will require regulations and orders to be approved in the future:

- Regulation on the granting of licences, to be approved by the Space Authority;
- Regulation on the pre-qualification procedure, to be approved by the Space Authority;
- Regulation on space objects registration, to be approved by the Space Authority;
- Regulation on the transfer of space objects, to be approved by the Space Authority;
- Order concerning caps on liability;
- Order on insurances.

The Portuguese Space Act offers several advantages when compared to other approaches for regulation of space activities, including the Model Law on National Space Legislation of the International Law Association.⁵⁷ Indeed, the Act:

⁵⁷ *Supra* note 28.

- Addresses in a single statute all relevant space activities', avoiding duplication of statutes;
- Addresses the operation of launch sites for pre-qualification purposes, opening the door to a future spaceport. It also avoids going into extensive detail, referring its construction and detailed operation to a specific statute if needed, thereby ensuring greater case-by-case flexibility;
- Adopts a licensing model allowing for a set of space operations to be jointly licensed, thereby promoting the launch of satellite constellations;
- It foresees the possibility of a special licensing procedure for certain type of situations, contributing to attract R&D into the country;
- It establishes an operator, site and space object pre-qualification model, which streamlines the licensing procedure;
- It establishes limitations of liability for operators;
- Although it foresees mandatory insurance, it allows for reduction of the insurance amount in certain circumstances and even its waiver (thus facilitating the launch and operation of small satellites);
- It centralizes the delivery of the applications to obtain a space activities' license and any other required authorizations in the Space Authority, thereby ensuring greater efficiency and coordination – one-stop shop;
- It punishes violation of the statute as an administrative offense, and does not create specific criminal penalties, which could discourage private activity.

All in all, the Portuguese Space Act represents a very recent example of a legal framework that was clearly designed to encourage private activity in the country and by national operators, as well as the recent space trends, especially the launch and operation of small satellites and constellations of satellites.

4. Conclusions

National laws play a central role in promoting private space activities, including the launch and operation of small satellites. For them to be successful, it is however important for countries to adopt a new policy and legal approach that is built together with and answers to the private sector. This is possible despite the provisions of the Space Treaties and, very much, because of the leeway the Space Treaties give for national space laws that can be flexible and adaptable to the evolution of the sector.

We have proposed a three-pronged approach for this purpose: firstly, giving back to private actors the leadership or co-leadership in developing new approaches and policies for space activities; secondly, the approval of a broader legal framework that, despite not being strict space law, has impacts on space activities; lastly, the approval of national space laws more conducive of private activities, such as the case of the Portuguese Space Act.

The three-pronged approach briefly described in this paper could, in our opinion, be very effective in ensuring that the domestic legal framework would be appropriate to promote private activities and to respond to the new trends in outer space operations, especially for the launch of small satellites.