

# The Concept of Launching State in Democratized NewSpace

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## 1. Introduction

In an everchanging space industry, which has seen the number of launches per year of objects increase from a handful every year, to hundreds, just in the span of less than a decade, legal certainty and guarantees at a global level are crucial in order to provide for a functional governance system for spatial activities.<sup>1</sup>

One key doctrine which sought to ensure accountability, and adherence to international laws, when venturing into outer space was that of State Responsibility for all space activities conducted. This is enshrined in Article VI of the Outer Space Treaty, often regarded as the magna carta of international space law. This concept is further augmented by associating liability to a Launching State by means of Article VII of the same Treaty.<sup>2</sup>

This paper will look at the concept of Launching State and its evolution over time. It will consider the challenges posed to this concept by the commercialisation and privatisation of the space sector and the efforts which have been made towards harmonisation of this doctrine with NewSpace. It will conclude by providing certain recommendations of steps which can be taken to further the continuity of the application of this doctrine and to ensure that spatial activities continue to expand while still being under the gauze of State Responsibility and Launching State liability.

## 2. The history of the concept of 'Launching State'

International space law is premised primarily upon a set of treaties developed in the 1960's and 70's that attempted to set the legal landscape for space

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1 See 2017 Space Launch Statistics by SpaceFlight101 at: <http://spaceflight101.com/2017-space-launch-statistics/>;

2 See Cheng B. (1995), International Responsibility and Liability for Launch Activities, Air & Space Law, Vol. XX, No. 6;

exploration. Among these treaties, two of the most important are the Outer Space Treaty of 1967<sup>3</sup> and the Liability Convention of 1971.<sup>4</sup>

During the beginning of the space age, and in the time these treaties were negotiated, the space domain was limited to government agencies of the strongest States. Even though private space activities were envisaged, it was considered prudent to collate every space mission to a State, especially keeping in mind the dual use possibilities of all space activities, and the importance of outer space to the military capabilities of each State.<sup>5</sup>

In order to ensure the application of State Responsibility, and thereby Liability, the Outer Space Treaty, in Article VI, and Article VII respectively, defined how spatial activities would be linked to the States through which they would occur. This was the introduction of the concept of Launching State into international space law.<sup>6</sup>

As such, Article VI denotes that States are responsible for, and hence, must authorise and continually supervise all space activities undertaken by subjects under their jurisdiction. This ensures that private entities which operate from under the jurisdiction of a particular State are linked to that State for the purposes of sending objects to outer space.

Article VII then goes on to specify that “Each State Party that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage...”. – This provision seeks to add liability to responsibility, such that damage caused by space objects is directly associated to the ‘launching state’ of that space object.<sup>7</sup>

The same text noted above is then repeated as a definition for the term ‘Launching State’ in Article II of the Liability Convention. Henceforth, a Launching State may be one of 4 States:

- the state that launches the space object;
- the state that procures the launch of the space object;

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3 The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205;

4 Convention on International Liability for Damage Caused by Space Objects, Nov. 29, 1971, 961 U.N.T.S. 187;

5 See Dembling, Paul G. and Arons, Daniel M., “The Evolution of the Outer Space Treaty” (1967). Documents on Outer Space Law. 3 Journal of Air Law and Commerce 33 (1967), pp. 419-456;

6 See Outer Space Treaty, Article VI; Bin Cheng, ‘Article VI Of The 1967 Space Treaty Revisited-’International Responsibility’, ‘National Activities’, And ‘the Appropriate State’.’ (1998) 26 Journal of Space Law;

7 For a detailed discussion on the concepts of Responsibility and Liability see Frans G von der Dunk, ‘Liability Versus Responsibility In Space Law: Misconception Or Misconstruction?’ [1992] Space and Telecommunications Law Program Faculty Publications;

- the state from whose territory the object is launched;
- the state from whose facility the object is launched.<sup>8</sup>

The first of these categories applies to the more traditional launches of space objects which can directly be linked to a State such that they are conducted through the State, usually either through a national space agency, or institute. The other three seek to expand the scope of State guaranteed spatial activities by including projects undertaken by private space actors, whether they be for a State itself, or through a State, by means of territory or launched by the facility of a State.

As can be construed, there may be more than one State which may qualify as the Launching State for a space object. Hence, the Registration Convention obligates one particular State to issue a notice to the UN Secretary General claiming, or officially entering space objects into the register maintained, through which they agree to be the Launching State for that particular object.<sup>9</sup>

### **2.1. Why is the concept of 'Launching State' important in international space law?**

The concept of launching state was borne out of a need to ensure compliance to international space law and policy and to hold States ultimately responsible, and thereinunder liable for ensuring that such adherence is maintained. For this reason, the concept is important in order to maintain harmony in outer space and also in order to ensure that private space companies do not conduct any activities in outer space which may conflict international law.<sup>10</sup>

The obligations to authorise and continually supervise, as instilled through Article VI of the OST ensures that States do not license, or allow for, through any other means, activities in outer space that would conflict with their obligations under international law. Moreover, it also serves to allow States to have a degree of knowledge, and oversight over spatial activities being conducted from within their jurisdiction.

Accountability, especially in a high-risk domain like outer space is highly important and the concept of Launching State, by putting the ultimate liability on States for all spatial activities undertaken by private actors, ensures that the relevant States take a high degree of care when licensing and

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8 See Legal and Regulatory Considerations of Small Satellite Projects, Christopher D. Johnson, Secure World Foundation;

9 See Registration Convention; UN GA Res 62/101, of 17 December 2007, 'Recommendations on enhancing the practice of States and international intergovernmental organisations in registering space objects', UN Doc A/AC.105/RES/62/101;

10 Elena Carpanelli and Brendan Cohen, 'Interpreting "Damage Caused By Space Objects" Under The 1972 Liability Convention' (2013) IAC-13,E7,1,5,x18256;

authorising subjects under their jurisdiction to partake in space activities. This adds towards the long-term sustainability of space and ensures that in cases where matters go south, there are reliable parties to seek recourse against.

Furthermore, noting the potentially multi-billion-dollar damages that space objects have the capacity to cause, it is also very useful, particularly for smaller NewSpace Companies to be able to depend upon their host State to guarantee, or insure, after a certain level, the activities of that company. This is commonly the case in many national space legislations where operators are only required to get third-party liability insurance of up to 60 Million USD, with any damages beyond that being ensured by their Launching State.<sup>11</sup>

### **3. Democratized NewSpace, Commercialisation of Space Activities, and the Challenges to the Launching State Doctrine**

The process of ‘democratization’ of space is described as outer space becoming accessible to developing countries, start-ups, educational institutes and other small to mid-size private enterprises, as opposed to only being limited to the most developed States and large multinational organisations. Led by the advent of the NewSpace industry, democratization can be credited to technological advancements such as additive manufacturing, micro-computing and innovative launch solutions which drastically reduce the cost of access to space.<sup>12</sup>

This new wave of activity into the space sector has challenged several of the concepts developed within the space treaties, as these treaties were not drafted in cognisance of such a privatised and robust model of space exploration, and were primarily negotiated by governments, for governments.<sup>13</sup>

Among these is the challenges posed to the concept of Launching State. The concept of Launching State in its present form is one which cannot be discarded later – this means there is a strong prevalence of ‘once a Launching State, always a Launching State’ for any object. As such, there presently

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11 See Hameed, H, *Annals of Air and Space Law Vol XLI ‘Small Satellites and Issues of Insurance: A European Perspective’*;

12 See Welsler, W, ‘The Democratization Of Space’ [2016] *Rand*; Baiocchi, D and Welsler, W, ‘The Democratization Of Space New Actors Need New Rules’ [2015] *Foreign Affairs*.

13 See Abrahamsson M, ‘Operating Commercial Space Tourism Vehicles From Sweden – Regulatory Challenges’, 61st International Astronautical Congress (2010); Jakhu R, ‘Twenty Years Of The Moon Agreement: Space Law Challenges For Returning To The Moon’ (2005) 54 *Zeitschrift Für Luft-und Weltraumrecht*; Henri Y, ‘The ITU - Challenges In The 21st Century Related To Small Satellites’ (ITU Symposium and Workshop on small satellite regulation and communication systems, Prague, Czech Republic, 2015); Hameed, H. *NewSpace: Legal Challenges and Implications*. 2016, Master’s Thesis, IIASL Leiden University 2016;

exist no rules that would allow for the changing of a launching state for a space object.<sup>14</sup>

This is increasingly problematic considering the high level of commercialisation which has taken over the space industry in the recent years. The concept of launching state, if interpreted solely and strictly through the the lens of the currently existing UN treaties on the matter, still operates on the aforementioned principle of ‘once a launching State, always a launching State’. This raises many issues, particularly when space objects are bought and sold in orbit on a regular basis, as is starting to become the case in the modern space age.<sup>15</sup>

The next sub-sections of this paper will look at common arrangements that take place as part of democratised NewSpace and how these do not fit into the notion of launching state. Notably, these sections do not seek to provide answers to these questions as these are looked at holistically in Section 4 of this paper.

### **3.1. The use of innovative launch solutions**

The democratisation of space, the rise of NewSpace, and the reduction in cost of access to space has been facilitated by the availability of cheaper space launch solutions which open up outer space to small and medium sized enterprises with limited budgets.

Innovative launch solutions seek to further reduce the cost of access to space and to make spatial activity more feasible. However, some of these solutions do not correspond with their traditional ground-to-space rocket counterparts and hence raise interesting questions about the application of the doctrine of launching state.<sup>16</sup>

Space launch methods such as LauncherOne presently being developed by Virgin Galactic, where a rocket is attached to an aircraft and launched from a high altitude raise concerns such as that of which State may be defined as the owner of the launch facility – there are several options:

- The State which controls the airspace from where the rocket detached from the aircraft;
- The State from which the aircraft took off;
- The State of registry for the aircraft;
- The State which financed/procured the launch.

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14 Jakhu, R., Jasani, B. and McDowell, J. (2018). Critical issues related to registration of space objects and transparency of space activities. *Acta Astronautica*, 143, pp.406-420.

15 Ricky J. Lee, “Effects of Satellite Ownership Transfers on the Liability of the Launching State” (2000)

16 For a full list of other orbital launchers refer to Page 17 of FAA Document titled: The Annual Compendium of Commercial Space Transportation: 2016. Published in January 2016;

Similar questions can be raised for launch solutions such as Bloostar, presently being developed by Zero 2 Infinity, which uses the rockoon concept of taking rockets to the stratosphere on a balloon and then launching them from there. This raises the additional issue of the distinction between airspace and outer space, such that would the rocket be deemed to be launched from outer space, or would stratospheric launches fall within the jurisdiction of the State which controls that particular part of the airspace.

Another innovative launch solution involves building, or transporting small satellites in, or to space stations such as the International Space Station, and then throwing them, either with, or without small propulsion mechanisms into orbit. This presents additional complexities of determining the Launching State, and presents several options such as:

- The State under whose registration the space object from which the satellite was thrown out from;
- The State under whose registration the space object within which the satellite was printed/made in;
- The nationality of the individual who physically threw out the satellite – keeping in mind their possible definitional identification as a ‘launcher’.

### **3.2. Cross-border procurement of space objects**

Among the various factors which may determine the launching State of an object, a reference has been made to the state which procures the launch. This can be found within the definition of launching State in the Outer Space Treaty and the Liability Convention.

The use of the term ‘procure’ has been problematic since its very first introduction keeping in mind that it is defined differently across languages with there being no settled international law definition for it. As such, procurement may be correlated to the act of financing a space object, or to quite simply facilitate its development.<sup>17</sup>

With new and innovative mechanisms being utilised for the financing of space assets, and with the development of new international laws to introduce harmonised systems of secured transactions law and asset-based financing of space objects, alongside new developments of national legislation for spatial financing, using models such as public-private partnerships and project financing, it becomes very complex to identify the particular State which may be designated as ‘procuring’ the launch of a space object.

International treaties which seek to facilitate the financing of space objects, for example the Space Assets Protocol of the Cape Town Convention have been drafted with this concern in mind, and hence go a long way towards ensuring their compatibility with existing international law. The Space Assets

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<sup>17</sup> See Hobe, S., Schmidt-Tedd, B., Schrogl, K., Popova, R. and Reynders, M. (2010). Cologne Commentary on Space Law - Outer Space Treaty’;

Protocol for example, in Article XXXV clearly respects the supremacy of current international law already existing on the matter. Moreover, international private law treaties are intrinsically dependent upon their public international law counterparts to determine the application of doctrines such as State Responsibility.<sup>18</sup>

Globalisation of the world economy, alongside the creation of regional alliances, such as the European Space Agency and the Asia Pacific Space Cooperation Organisation which often facilitate funding for private space actors based within their Member States adds to the complexities as several options get created with regards to the question of launching state.<sup>19</sup>

### **3.3. In-orbit sales of satellites**

Another important consideration is that of sales of space objects once they have already been placed in orbit.

This is a common practice now in the space industry where large-scale satellite operators will sell, or lease objects already in outer space to States, or operators looking to make use of them. This raises many questions of who the Launching State of that particular object is and if something were to go wrong with the operation of the sold or leased space object, which State will ultimately bear the responsibility and liability for it.<sup>20</sup>

### **3.4. Unauthorised launch of space objects**

With the entry into the space sector of several smaller more robust companies, and with the increasing availability of an array of launch service providers, it may now also be plausible for objects to be launched into outer space without the prior authorisation of the State within which the operating company might be incorporated within.

This was the case of four satellites recently launched into orbit using an Indian launcher developed by a company based in the USA.<sup>21</sup>

Incidents like these raise crucial questions of what State will be responsible and consequently liable for any damages that such unauthorised satellites might cause, after their placement in orbit, or even during launch.

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18 See Peter van Fenema, 'The Unidroit Space Protocol, The Concept Of 'Launching State', Space Traffic Management And The Delimitation Of Outer Space' (2002) 28 *Air and Space Law Journal*;

19 Carl Q. Christol, *The Modern International Law of Outer Space*, (New York: Pergamon Press, 1982)

20 See Dempsey, Paul Stephen, *National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement* (March 30, 2016). *Northwestern Journal of International Law & Business*, Vol. 36, No. 1 (2016). Available at SSRN: <https://ssrn.com/abstract=2943383>;

21 An unauthorized satellite launch in India threatens US regulatory reform in space - By Tim Fernholz, March 13, 2018 <https://qz.com/1226962/an-unauthorized-satellite-launch-in-india-threatens-us-regulatory-reform-in-space/>;

### **3.5. Large scale privatisation of the space industry**

Cases such as the privatisation of Inmarsat and other large space companies that already had assets in outer space registered to a particular State, also raise a cause for concern where if after the privatisation, the majority stake within such a company no longer rests with nationals of the State which had registered the space objects.<sup>22</sup>

### **3.6. Physically Linked Space Objects**

Another important consideration, which has more to do with technological advancements in the methodologies of exploring space rather than purely its democratisation is the advent of physically linked space objects.

Objects such as the international space station, which are an amalgamation of space objects launched by different launching States with separate registrations also raise the question of how the issue of liability will be addressed if there is damage caused from one part of the object to the another.

The very recent case of a hole being found on the Russian side of the space station, which is alleged to have been drilled on purpose by one of the members of the crew, raises questions such as whether the drill machine used to make the hole could be considered as being a ‘component part’ of one of the space objects that form the ISS as a whole. If yes, then the host State of that object, brought into the equation entirely due to its drill being used may end up in a position where it is liable for the damage caused.<sup>23</sup>

## **4. Launching state moving forward and Conclusion**

Moving forward, it is highly important to ensure that the concept of Launching State fits within the new formed democratised space industry. This is in order to ensure that accountability for activities in outer space continues to rest in the hands of States rather than individuals or private companies.

In order to maintain this harmony, a crucial role can be played by international law, which can further be augmented by detailed private law rules, either channelled through international organisations, or domestic law.

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22 David W. Sagar, “The Privatization of Inmarsat” (1998) 41 Proc. of the Colloq. on the Law of Outer Sp.; David W. Sagar, “The Privatization of Inmarsat – Special Problems” (1999) Proceedings of the Third ESA/ECSL Colloquium on International Organizations and Space Law – Their Role and Contributions, Perugia, Italy

23 Russia claims ISS leak was SABOTAGE after ‘drill hole’ found in space station’s hull - By Henry Holloway / Published 4th September 2018, <https://www.dailymail.co.uk/sciencetech/article-6129601/Russia-says-space-station-leak-deliberate-sabotage.html>;



#### **4.1. The role of international law**

A good example of an international law effort to remedy this situation is UNGA Resolution 59/115. Application of the concept of the “launching State” adopted by the General Assembly on 10 December 2004.<sup>24</sup>

This Resolution, among other things, reiterated the importance for States to diligently file registrations for space objects which are launched by operators working from within their jurisdictions. It further recommended that States conclude thorough agreements, which are in line with the Liability Convention, in cases of joint launches, or in the cases of in-orbit transfers of space objects.

Lastly, this Resolution also encouraged States to harmonise their practices in relation to such matters in order to facilitate operators and ensure consistency within the system.

#### **4.2. Private law remedies**

Besides international law, there are presently two approaches being used to tackle these issues. One is by means of using contractual provisions in the launching of space assets to cater for changes in its ownership in the future.

These situations which are usually dealt with by contracts normally include:

- sale of a satellite (involving satellite manufacturer and buyer/operator);
- launch of a satellite (involving satellite owner/operator and launch company);
- sale of satellite plus launch, also known as ‘on-orbit delivery’ (involving satellite manufacturer and buyer/operator plus satellite manufacturer and launch company);
- insurance of launch and of in-orbit operations (involving insurance company and (some of) the above parties);
- use of a satellite (involving satellite owner/operator and user); and
- financing of satellites (involving satellite buyer/operator and manufacturer/bank).

Alternatively, there are issues which are also dealt with through national space legislation. These commonly include:

- operational and safety requirements (usually handled through licences);
- market access and competition issues, including export control (handled through a variety of legal instruments);

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<sup>24</sup> See Resolution adopted by the General Assembly on 10 December 2004 59/115. Application of the concept of the “launching State” [http://dag.un.org/bitstream/handle/11176/251482/A\\_RES\\_59\\_115-EN.pdf?sequence=3&isAllowed=y](http://dag.un.org/bitstream/handle/11176/251482/A_RES_59_115-EN.pdf?sequence=3&isAllowed=y)

- liability and insurance (also usually handled primarily through licences), as based on Article VII of the Outer Space Treaty and the Liability Convention;
- debris mitigation (increasingly handled through licences), as based on the Space Debris Mitigation Guidelines; and
- registration in a national register, as based on Article VIII of the Outer Space Treaty and the Registration Convention.<sup>25</sup>

#### **4.3. Conclusion**

Ideally, it would be best to develop, at an international level, standard operating procedures for the transfer of space assets between States. Moreover, guidance documents such as the UN Resolution 59/115 Application of the concept of the “launching State” are very useful in offering support to States and operators on the way forward.

The concept of Launching State is an important doctrine within space law and is imperative to the ascription of the State Responsibility towards space activities conducted by private actors in democratised NewSpace. Henceforth, it is important that steps are taken in the international community to address these issues in order to provide greater certainty on these matters moving forward.

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25 See Peter van Fenema, Legal aspects of launch services and space transportation in Tronchetti, F. and Dunk, F. (2017). Handbook of space law. Cheltenham: Edward Elgar.