

Space Entrepreneurship and Space Law – Future Challenges and Potential Solutions*

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Abstract

The space industry is undergoing an interesting process, opening the market to private entrepreneurs and investors. Space activities that were traditionally carried out by state-agencies are now carried out and funded by non-governmental entities. These space activities include: launch activities, space tourism, asteroid mining, space exploration, and satellites' applications. The innovative character of the above space activities derives additionally from their novel manner of legal organization and funding. The shift from governmental-agencies to private entities is a dramatic one, introducing not only the "simple" form of private companies, but also non-profit organizations. There are space projects which are "crowd-funded" via web platforms like "Kickstarter", while others are funded by donations, like in the case of participating teams in the "Google Lunar X-Prize" competition. The complexity of the legal structure of such projects while noting their collaborative nature raises legal questions pertaining to state responsibility and liability under international and national space laws. Pondering the above-examples, it gets increasingly difficult to define the project's "nationality" pursuant to Article VI of the Outer Space Treaty, 1967 ("Treaty") and therefore, finding the "appropriate state" to "authorize" and "supervise" the space activity. Further, these activities may be subject to more than a single national regime of space laws, which may not offer conflict of law provisions. The innovative funding schemes may also create a difficulty defining the "launching States" pursuant to Article VII of the Treaty and the Liability Convention, 1972, especially with respect to states which "procure the launch". These difficulties reflect on the willingness of some launching states to register the space object, pursuant to Article VIII of the Treaty and the Registration Convention, 1975. Such legal challenges are at the core of development for private space entrepreneurship. The aim of the paper is to raise awareness to the legal challenges above by taking crowd-funded small satellites projects as a case study, and to offer potential solutions: While the

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international space treaty regime remains traditional and does not focus on private space entrepreneurship, new-emerging national space laws can help to bridge the gap between traditional space law and the new reality of space entrepreneurship. Financial tools like insurance may solve some state-liability aspects in this context. These exciting developments will lead humanity to new frontiers in outer space, and lead us, space lawyers, to new territories of legal thought.

1. Introduction

When thinking about private entrepreneurship in outer space, large scale projects may come into mind. “Virgin Galactic” and “Space X” are examples of private commercial companies founded by entrepreneurs who were well established commercially before pursuing ambitious space projects. In the following paper, I wish to present different examples of private entrepreneurship in the space sector of the “newer generation”.

Recent projects show that private space activities are not necessarily commercial per se, they do not necessarily enjoy large scales, and thus challenge the paradigm that space projects should be supported by wealthy investors in order to “get up from the ground”. Examples for these kinds of projects will be presented in section 2 of this paper.

The ways in which such new generation projects evolved differ in legal structure, funding resources and human resources. When considering this diversity, it is clear that the traditional interpretation to the classic space treaty law may not be able to accommodate the rapidly developing sector. Furthermore, there are other legal challenges that derive from the organizational structure of these projects. Examples for such potential legal challenges will be presented in section 3 below, using crowd-funded small satellites projects as a case study. Finally, potential solutions for the legal challenges and conclusions will be brought in section 4.

2. The New Entrepreneurs: Crowd-Funding, Non-Profit Organizations, Donations and Space Activities

The Google Lunar X Prize competition encouraged private entities to pursue space activities, particularly with connection to the Moon.¹ In some cases, new private entities were established in order to organize the activities under the competition. More specifically, some of these new entities were established as non-profit organizations. While only some of the currently active competing teams clearly declare they are established as a non-profit organization², other

1 See: Google Lunar X Prize: (<www.googlelunarxprize.org/>).

2 See: Google Lunar X Prize: (<www.googlelunarxprize.org/teams/team-spaceil/>); (<www.googlelunarxprize.org/teams/jurban/>); (<www.googlelunarxprize.org/teams/omega-envoy/>).

teams are seeking “donations” which indicates the same type of establishment.³ In addition to the financial help received by donors, these entities are helped by and comprised of many volunteers.⁴

As this competition created much interest in landing private spacecrafts on the Moon’s surface, NASA issued a set of Guidelines in 2011 creating certain “keep out zones” on the Moon, protecting historical Apollo artefacts. The essence of these Guidelines was translated into a proposed Bill earlier in 2013, potentially establishing a U.S. national park on the Moon.⁵

There are additional space activities which are funded by donations. Recently the use of crowd-funding web platforms like “Kickstarter”⁶ and “Indiegogo”⁷ are becoming very popular with respect to space projects.

These platforms allow entrepreneurs to publicly present their project, and offer small tokens of gratitude in return to a pledge. The entrepreneur defines the amount that she/he requires in order to promote the project, and when a project is successfully funded by the use of the platform, the website gains a certain percentage out of the funds collected. Typically, projects are funded by micro-donations, scaling to \$10-100, with large number of donors. Therefore, such funding is spread worldwide among many private individuals.

The crowd-funded space projects are diverse; we can find for example a small telescope owned by “Planetary Resources”- a private company aiming to mine asteroids⁸; miniature space hardware- a creation of a young individual entrepreneur⁹; CubeSats¹⁰; a propellant system for spacecrafts¹¹; a space elevator project¹², near space balloons projects¹³ and more.

3 As opposed to a commercial legal entity which seeks for private investors rather than donors.

4 For instance, team SpaceIL includes many volunteers and has various roles for them: (<www.spaceil.com/j/how_can_i_help/>).

5 For further reading see: N. Palkovitz, A National Park on the Moon: When Moot Court Cases Come to Life, Leiden Law Blog (16.07.2013) (<leidenlawblog.nl/articles/a-national-park-on-the-moon-when-moot-court-cases-come-to-life>).

6 Kickstarter: (<www.kickstarter.com/hello?ref=nav/>).

7 Indiegogo: (<www.indiegogo.com/learn-how-to-raise-money-for-a-campaign>).

8 Arkyd (<www.kickstarter.com/projects/1458134548/arkyd-a-space-telescope-for-everyone-0?ref=live>).

9 KickSat (<www.kickstarter.com/projects/zacinaction/kicksat-your-personal-spacecraft-in-space?ref=history>).

10 ArduSat (<www.kickstarter.com/projects/575960623/ardusat-your-arduino-experiment-in-space?ref=live>).

11 Hermes Spacecraft (<www.kickstarter.com/projects/hermesspace/hermes-spacecraft?ref=live>).

12 Space Elevator Science (<www.kickstarter.com/projects/michaellaine/space-elevator-science-climb-to-the-sky-a-tethered?ref=live>).

13 Photograph the Earth from space (<www.kickstarter.com/projects/220489357/photograph-the-earth-from-space?ref=tag>); HEARTSAT

The aforementioned small telescope named “Arkyd” raised \$1,505,366 via the Kickstarter web platform, which were donated by 17,614 “backers” and is one of the most funded projects on Kickstarter for 2013.¹⁴

It is estimated that small satellites related projects raised almost \$500,000 using Kickstarter.¹⁵

In light of these examples it is clear that it is now easy more than ever to take a piece of the space action, both for entrepreneurs and for individual investors of the public. The shift to a model of diverse entities perusing space activities is interesting and challenging when considering the traditional legal framework for space activities, as shown below.

3. Presenting the Legal Challenges: Crowd-Funded Small Satellites Projects as a Case Study

Most of the small satellites crowd-funded projects mentioned above have educational or technology-demonstrative objectives. Since these satellites are launched as auxiliary payloads, and enjoy a number of launch opportunities, it is possible to fund at least some of the launch costs via crowd-funding web-platforms.¹⁶ The same is true for the satellite’s components and sub-systems, including standard of the shelf technology, which are available for purchase

(www.kickstarter.com/projects/145704440/heartsat-a-scientifically-rewarding-journey-to-nea?ref=tag); The Kua Fu Initiative (www.kickstarter.com/projects/1908351974/the-kua-fu-initiative?ref=tag); Cygnus Project (www.kickstarter.com/projects/590104702/cygnus-project-sending-cameras-to-space?ref=tag).

14 Most funded projects (www.kickstarter.com/discover/most-funded?ref=footer).

15 The sums pledged in the following project were taken into account:

(www.kickstarter.com/projects/981958479/help-us-build-a-satellite?ref=live); (www.kickstarter.com/projects/pocketqube/want-to-build-a-satellite-but-dont-have-a-nasa-siz?ref=live); (www.kickstarter.com/projects/880837561/skycube-the-first-satellite-launched-by-you?ref=live); (www.kickstarter.com/projects/aresinstituteinc/lunarsail-the-worlds-first-crowdsourced-solar-sail?play=1&ref=search); (www.kickstarter.com/projects/1775006829/team-prometheus-n-prize-mission?play=1&ref=search); (www.kickstarter.com/projects/597141632/cat-a-thruster-for-interplanetary-cubesats?play=1&ref=search); (www.kickstarter.com/projects/1569698176/1000-student-projects-to-the-edge-of-space?ref=tag); (www.kickstarter.com/projects/573935592/were-putting-a-tardis-into-orbit-really?ref=tag); (www.kickstarter.com/projects/575960623/ardusat-your-arduino-experiment-in-space?ref=live); (www.kickstarter.com/projects/zacination/kicksat-your-personal-spacecraft-in-space?ref=history).

16 As opposed to a “regular” launch of a primary payload which costs many millions of Dollars/Euros, the mentioned auxiliary payload launches are generally affordable at a scale beginning from thousands of Dollars/Euros, depending on the launch opportunity and the mass of the satellite.

on the web.¹⁷ In some cases commercial companies from the small satellite industry sponsor these projects as well, after they were exposed on the web, benefiting from the advertising potential.¹⁸

The legal challenges relating to these crowd-funded space projects can be divided as follows: The first part relates to national export and commercial laws in connection to the organizational aspects of the space activities, and the second part steams from the difficulty to apply existing international space law to these activities.

Both of the foundations of these legal challenges will be examined against fundamental provisions of the Outer Space Treaty, 1967¹⁹ namely: Article VI establishing state responsibility in connection with space activities carried out by non-governmental entities, Article VII establishing the liability regime relevant to the launching state(s) as further developed in the Liability Convention, 1972²⁰ and Article VIII which introduces the duty to register launched space objects by one of the liable launching states, as further developed in the Registration Convention, 1975.²¹

Legal Challenges Relating to Export Law and Commercial Law Which Derive from the Organizational Aspects of the Activities

Firstly, attention must be made to the character of the entities which function as open organizations, recruiting and involving volunteers or members as opposed to employees. Traditionally space activities in governmental or large scale commercial projects would be carried out by professional employees. The use of volunteers has many advantages and it could be argued that this practice is crucial in order to promote space activities amongst young individuals, however, there may be several legal implications connected to this practice.

Leaving domestic labour laws aside, using a large number of volunteers which are free to join and leave the organization as they please, may have implications with respect to export laws, the need to keep certain information confidential, and manage intellectual property rights. This is of course relevant to other sectors as well, however, compliance with export controls is still a pivotal need when dealing with space technology.²²

It is reasonable to assume that a small scaled project operating on seed money cannot gather sufficient resources to monitor compliance with respect to each

17 See for example the CubeSatShop.com: <www.cubesatshop.com>.

18 See for example the case of ArduSat *supra* note 10.

19 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 1967 610 U.N.T.S. 205. (Hereinafter: “Outer Space Treaty”).

20 Convention on International Liability for Damage Caused by Space Objects, 1972 961 U.N.T.S. 187. (Hereinafter: “Liability Convention”).

21 Convention on Registration of Objects Launched into Outer Space, 1975 1023 U.N.T.S. 15. (Hereinafter: “Registration Convention”).

22 See for example: H.P. van Fenema, *The International Trade in Launch Services: The Effect of U.S. Laws, Politics and Practices on its Development* (1999).

of its many volunteers. Furthermore, since the entrepreneurs and the volunteers are at times non-professional but rather space enthusiasts, it is reasonable to assume that they will lack awareness with respect to some compliance matters. Another organizational aspect relating to dissemination of information relates to the open and public nature of the activities. The communication with the group executing the project or with the private micro funders is largely based on social media.

Many of these projects have a “Facebook” page, and all entrepreneurs on Kickstarter update existing and potential funders on the planed project. These materials vary, and include video clips, drawings, illustrations, procurement plans and so on. Some of which are extremely detailed and include more than basic technical information.²³

This type of exchange of information or publications relating to these space projects are very frequent, casual and do not seem to be supervised by an “appropriate state”.²⁴ Additionally, there are no indications that the space projects are being over-supervised by the owners of the web platforms (compared to projects which are not related to space activities).

Often these websites disclaim any responsibility, liability, and make no warranties with respect to the projects and the exchanged information.²⁵ This might be a concern if the information is export controlled, however, due to the communal and at times non-commercial nature of the projects, there is lack of awareness to such restrictions.

Generally, non-profit organizations and associations are usually obliged to comply with minimal reporting and mandatory capital requirements under domestic laws which govern them. Hence, the level of regulatory supervision under national laws is low from the get-go relating to these private space activities. Because these organizations are not obliged to report and regularly submit formal paper-work to the authorities, they do not have to maintain high administrative standard of internal information, such as lists of volunteers, financial arrangements, and intellectual property related documents. Hence, it is difficult to anticipate full compliance of such organizations with confidentiality agreements, considering their members may join-in or leave quite easily.

Financially, these organizations enjoy donations of private sources. Therefore, they are not obliged under conditions of a bank loan, they are not undergoing due diligence processes, nor they are required to submit a business plan before conducting the space activity.

Donations may run out during the course of activities, subsequently leaving an “orphaned small satellite” in orbit, in the absence of an alternative operator.

23 Some even distribute software code practically waiving intellectual property rights in their developed software.

24 See analysis relating to Article VI of the Outer Space Treaty below.

25 Such disclaimers should not affect the treaty obligations of the hosting state under international public law even if valid pursuant to domestic law: Vienna Convention on the Law of Treaties, 1969 1155 *U.N.T.S.* 331 Article 27.

The lack of financial resources may influence the decision to procure insurance coverage for the mission as well. Absent an appropriate insurance, and lack of incoming funds will probably result in failure of recourse towards the responsible or launching state, should damage be caused to third parties during launch activities and/or during in-orbit operations.²⁶

Finally, these organizations are usually very easy to establish. Hence, they could be used as a hosting entity for space activities in the context of “license shopping”.²⁷ The organization will be established under the laws of the desired state, in order to be subject to its licensing regime. Funds may be transferred as a donation made by a private commercial entity which has an interest in the planned space activity.

Challenges in Applying Traditional Space Law

Article VI of the Outer Space Treaty relating to state responsibility introduces some legal challenges. Firstly, identifying the “appropriate state”, which is the state that the “national activities in outer space”²⁸ can be attributed to, may become a difficult task. Secondly, the same “appropriate state” must authorize and continually supervise the activities.²⁹

26 This is true especially in cases where the national space law does not condition authorization with insurance or with a proof of sufficient funds in order to carry out a space activity and in cases where there are no applicable national space laws.

27 For “license shopping” in the context of space activities see: T. Masson-Zwaan, *Article VI of the Outer Space Treaty and Private Human Access to Space*, Proceedings of the International Institute of Space Law 2008, 536, AIAA, (2009) under section 7.

28 One approach focuses on the meaning of “national” as an expression of a natural person or a legal entity which are considered to be nationals of a certain state. Therefore, “national activities” are activities carried out by the nationals of the state. A second approach interprets “national activities” using the provisions of Article VII of the Outer Space Treaty, linking the responsible state to the liable state. Therefore, according to this approach the responsible state has to be a “launching state”. The latter approach does not acknowledge the differences between state responsibility and liability. See: F. von der Dunk, *The Origins of Authorization: Article VI of the Outer Space Treaty*, in *National Space Legislation in Europe*, F. von der Dunk (Ed.) 1, 12-13 (2011); F. von der Dunk, *Liability versus Responsibility in Space Law: Misconception or Misconstruction?* IISL Proceedings of the 34th Colloquium on the Law of Outer Space, 363 (1992).

29 Article VI of the Outer Space Treaty: “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for

By way of example, in a possible case of a launch of a small satellite, the activity may be initiated by a non-governmental entity (commercial, a non-profit organization, an association, a non-incorporated group of individuals and so on). In some cases these entities are comprised of individuals of different nationalities.³⁰ This raises the following questions:

- Which state would be the appropriate one to authorize and continually supervise the activities?
- What should be the case in the situation where all national states involved have not yet enacted a domestic space law?
- What should be the case when the activity is subject to more than one licensing regime?

Considering the financial aspect, many additional questions arise. The Basic question is whether a donation financing the space activity may establish a relevant legal link between the donors and the activity? And between the state of nationality of such a donor to the activity?³¹ Other questions in this respect are:

compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.”

30 National space legislation may be applicable to individuals of that national state, meaning applicability will be on a personal-national basis, even if the group is not incorporated, leading to a situation where more than one national regime will be applicable to the space activity. For examples of national space legislation applicable by personal jurisdiction *see*: Schematic Overview of National Regulatory Frameworks for Space Activities, UN Doc. A/AC.105/C.2/2013/CRP.7 (09.04.2013). Some domestic laws refer to the situation of conflict of laws while others are silent.

31 *See*: B. Cheng, *Article VI of the Outer Space Treaty Revisited: “International Responsibility”, “National Activities”, and “The Appropriate State”*, 26(1) *Journal of Space Law* 7, 16-18 (1998): “More difficult is the question whether the international responsibility of the States Parties extends to non-governmental entities’ failures to comply with rules of private law, including contractual obligations, such as for example those relating to intellectual or industrial property. Is such responsibility precluded by the qualification that the States Parties have assumed only international responsibility, and therefore not responsibility under municipal law? Or does the qualification international, on the contrary, only make it clear that the contracting States are responsible directly to one another in respect of their non-governmental activities, under both international law and municipal law? And, if the State is responsible under Article VI, does this responsibility arise the moment the breach occurs under municipal law, or only after the exhaustion of local remedies not only against the private entity concerned, but also against the State allegedly responsible? One may wonder whether Article VI intends to go as far as making the contracting States directly responsible for all breaches of private law and private law obligations by their non-governmental entities. However, the wording does not preclude this, and this is a point which is worthy of attention in any review of the 1967 Space Treaty, bearing in mind particularly the phenomenal development in private space activities since the beginning of the space age.”

- Can a micro investment by a private entity in a space project trigger state responsibility by becoming a “national activity” of the state?
- If so, should changes be made to the criterion of nationality as attributing private space activities to the state? (e.g. by amending or supplementing the provisions of Article VI of the Outer Space Treaty³²)
- Should states restrict the possibility of crowd-funding for space projects in order to avoid massive exposure to international responsibility, and possibly liability?
- If so, on the basis of which criteria?
- Should a web-platform for crowd-funding be used to raise money in order to procure a launch for the small satellite from the given example, does this mean that the state most associated with the donations will be one of the launching states because it was “procuring the launch”?³³ Additionally noting funders can contribute regardless of their nationality, and whether such nationality is the same nationality of the entrepreneurs initiating the project. Therefore, such launch will be funded by persons of many nationalities.

Clearly these situations could not have been foreseen by the drafters of Articles VI and VII of the Outer Space Treaty and the Liability Convention.

States might not be willing to accept any implied liability on the account of registering the space object in question according to Article VIII of the Outer Space Treaty and the Registration Convention, even noting registration does not necessarily affect the existing situation relating to state liability for damage caused by the space object, since the relevant identification of liable state(s) is made pursuant to Article VII and the Liability Convention.³⁴ Article II(2) of the Registration Convention merely states³⁵ that only one of the identified liable states (which are the “launching states”) shall register the space object.³⁶

In the case of the launch of the small satellite, establishing a legal link by registration, between the state of nationality of the entrepreneur and the satellite (as

32 As Cheng suggests, *ibid*.

33 In the meaning of Article VII of the Outer space Treaty and subsequently, the Liability Convention.

34 See in the context of small satellites: N. Palkovitz and T. Masson-Zwaan, *Orbiting under the Radar: Nano-Satellites, International Obligations and National Space Laws*, IISL Proceedings of the 55th Colloquium on the Law of Outer Space, Naples, Italy, 566 (2013).

35 “Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object in accordance with paragraph 1 of this article, bearing in mind the provisions of article VIII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof.”

36 For the connection between state responsibility, liability and registration of space objects see: B. Cheng, *Studies in International Space Law* 609 (2004).

a “space object”), is highly important and even critical for the execution of the space activity. This is due to the fact that these satellites are launched as auxiliary payloads, and essentially are joining a ride to space as was procured by the primary payload.³⁷ Therefore, one of the launching states is the one operating the launch vehicle which is a facility used to launch the satellite³⁸, and at times another launching state is the one that the satellite is being launched from its territory.³⁹ These states are often not identical to the state procuring the launch of the satellite, and they commonly contractually-condition the launch with registration of the small satellite by the state of nationality of the satellite’s owner. This is the reason why identifying the state which procures the launch is especially practically-relevant in such a case. At times it will not be clear if the state of nationality of the entrepreneur is the same state which procures the launch, as illustrated, due to the possibility of having several of nationals of different states funding the launch, and due to the fact that the treaties do not acknowledge private “ownership” in the space object as a criteria for determining the launching-liable state(s).

Furthermore, a weak link between the space activity and the registering state may most probably affect the state’s ability to exercise its “jurisdiction and control” over such activity, causing limited fulfilment of the obligations under Article VIII, and the Registration Convention.

4. Potential Solutions and Conclusions

The process in which outer space is becoming increasingly accessible is a worthy one. It is in line with some fundamental principles of space law such as the equal, non-discriminatory and free exploration and use of outer space.⁴⁰ It is only natural that non-governmental entities and individuals are getting increasingly involved in pursuing space activities. Therefore, in light of the above, there is a need to examine the role of non-profit organizations, web platforms and social media in the context of space activities. This examination should

37 When launched vertically, by a “traditional” launch vehicle.

38 Article VII of the Outer Space Treaty: “[...] and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts [...]”.

39 *Ibid*, “territory”. In some cases the state which owns the launch facilities and the state from which its territory the launch is carried-out, are different states. A common example is the launch by a Russian launch vehicle from the territory of Kazakhstan.

40 Article I of the Outer Space Treaty; in the context of low budget space projects funded by donations, The Space Benefits Declaration is relevant as well: Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of all States, Taking into Particular Account the Needs of Developing Countries, UN GA Res. 51/122 of 13 December 1996.

consider both international space law and related domestic laws such as national space legislation and export laws, as they relate to certain controlled space technology, hardware and software.

Particularly on the international level, there is a need to understand the nature of the legal link between donations and state responsibility for space activities. Additional inquiry is also required on the connection between donations and liability.

State parties to the Outer Space Treaty have a duty to fulfil their obligations on the international level under Article VI, ensuring that non-governmental national activities in outer space are carried out in conformity with the Treaty. Furthermore, the state should authorize and continuously supervise these activities. These duties are usually translated to creation of a domestic licensing regime, supported by legislation, allowing state-nationals to pursue space activities.

Following this, the state should act in order to regulate private space activities at least to some extent if not fully. Because this duty was fulfilled only by certain states parties to the Treaty⁴¹, the private industry may face difficulties when pursuing space activities, due to the uncertainty and lack of harmonization⁴² of domestic space legislation. The main difficulty relates to the ability of such entities to attract investors, make long term commitments towards customers or donors in such a situation. From the other side of the same coin, if damage does occur, international law dictates that the state of nationality will be responsible, and the launching states liable. This disconnection between the private entity and the international obligations assumed by the hosting state creates a disorganized legal reality.

Where there is a regulatory vacuum the state should fill it or alternatively supply appropriate legal tools and infrastructure for private entities to cope with such vacuum and uncertainty. Where vacuum exists the private entrepreneur is forced to make decisions relating to the space activity, while the outcome of such decisions may be attributed to one or more certain states. Therefore, the above proposed examination should be carried out by states, as they are most likely to be responsible and liable to these activities should damage occur, pursuant to international law.

It would be in the benefit of both states and the private industry if the findings of such examination will be incorporated within national space laws, as well as other domestic legislation, creating a better sense of legal certainty, and bridging the regulatory gap between the international and domestic level.

41 For instance currently only six EU member states have enacted a domestic space law establishing a licencing scheme: Sweden, United Kingdom, Belgium, The Netherlands, France and Austria. For a summary of these laws *see* UN Doc. *supra* note 30.

42 For further reading on the issue of harmonization of national space laws in EU member states *see*: M. Sanchez Aranzamendi, Economic and Policy Aspects of Space Regulation in Europe: The Case of National Space Legislation - Finding the way between Common and Coordinate Action, 21 ESPI Report at 39 (2009).

For instance, under a domestic licensing regime, a certain state could restrict legal establishments carrying-out space activities to commercial entities, and non-profit entities of a certain type, allowing better supervision over the activities.

Other than increasing the certainty with respect to national space laws, the liability aspects, which are simply risks connected to space activities may be mitigated by appropriate insurance obligations.

Finally, there is a true need to regulate such private activities in a timely manner, preventing extensive restrictions by states due to state responsibility and liability at a stage of “no return” which will impede the progression of projects by private entities carrying-out space activities.

The first step finding an appropriate solution would be raising awareness with the entrepreneurs, and the administration responsible for their activities. It would be reasonable to consider raising awareness via the web, using the already existing platforms from which the entrepreneurs and their volunteers communicate and operate.