Legal Challenges of the Deployment of Cubesats from the International Space Station

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Abstract

The deployment of cubesats from the International Space Station (ISS) is a groundbreaking technique for satellites to achieve orbit, allowing their release from an already orbiting space object. From the legal point of view, this method entails some relevant profiles deriving from the fact that the space object reaches its target orbit in two phases: first, it is carried onboard a cargo vehicle to the ISS, secondly it is deployed therefrom. As multiple actors are involved in this two-stage technique, there is the need to identify the States bearing the relevant obligations as "launching States", also considering the distinctive features of the ISS as a complex space object and paying attention to the practice of registration of objects deployed therefrom. Since deployments from orbiting objects are expected to increase, verifying if the existing definitions, and their current interpretation, fit this new opportunity would help ensure compliance with the legal framework governing space activities.

1. Cubesats as a mean for enhancing access to space

1.1. Tiny objects, great possibilities

Technological development has marked massive shifts in human capacity to explore outer space. Among the new space applications that are setting the scene in the current decades, cubesats have a premium role. These are tiny objects belonging to the category of nano and pico satellites, with a standard specification of 10-cm cube and a mass not exceeding 1 kg. Despite their small size, they can be used for many purposes, including Earth Observation, mission technology experiments, astrobiology, and can be side components in missions of exploration of celestial bodies.[1]

Cubesats started to be developed in the early 2000s for educational purposes. Thanks to the low cost and limited component complexity, they were deemed

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1 G. Santilli, C. Vendittozzi, et al., CubeSat Constellations for Disaster Management in Remote Areas, in Acta Astronautica, Vol. 145, April 2018, pp. 11-17.

suitable to provide students with hands-on experience in space technologies, allowing them to experiment the whole lifecycle of a space project, from development, to manufacturing and deployment in orbit.

The original characteristics of low cost and low level of complexity have evolved during the years, as cubesats have proven to be viable solutions also for commercial purposes in various domains, embedding cutting-edge technologies and being included in large satellites constellations. Indeed, from a commercial viewpoint, cubesats greatly reduce the size of investment needed to realise a space venture, changing the investment risk model.[2] These tiny objects are increasingly used by companies and space agencies worldwide and constitute the most relevant example of the trend of miniaturization of space technologies.[3] Remarkably, market studies have identified that the economic value of cubesats amounted to $152 million in 2018 and is estimated to reach $375 million by 2023.[4]

In parallel, cubesats have also proven to provide a valuable pathway for developing and emerging countries to access outer space, due to their mentioned characteristics low cost and less complex manufacturing compared to traditional satellites. In this line, several countries with limited or no space capabilities have used cubesats as their first stepover towards the development of national space activities. In recent years, the opportunity of accessing outer space through cubesats has been seized worldwide by countries starting to undertake national space activities, including Costa Rica, Ecuador, Peru, Guatemala, Kenya, Ghana, and Mauritius. Often, the cubesats were developed within the framework of international cooperative programs aimed at enhancing access to outer space, like the Joint Global Multi-Nation Birds Satellite and the KiboCUBE programme, a cooperation between the United Nations Office for Outer Space Affairs (UNOOSA) and the Japanese Space Agency (JAXA) providing the opportunity to develop a cube satellite and have it deployed from the Japanese module "Kibo" of the ISS.

2 S. Mosteshar, I. Marboe, Authorisation of Small Satellites under National Space Legislation, in I. Marboe (ed.), Small Satellites. Regulatory Challenges and Chances, Leiden, 2016, pp. 129-153, p. 130.

3 Some prominent programs include the National Aeronautics and Space Administration's (NASA) CubeSat Launch Initiative program and the European Space Agency (ESA)-funded Student Space Exploration and Technology Initiative; T. Villela, C.A. Costa, et al., Towards the Thousandth CubeSat: A Statistical Overview, in International Journal of Aerospace Engineering, 2019, Article ID 5063145; K. Woellert, P. Ehrenfreund, et al., Cubesats: Cost-effective Science and Technology Platforms for Emerging and Developing Nations, in Advances in Space Research, Vol. 47, Issue 4, 2011, pp. 663-684.

4 P. Mhangara, The Emerging Role of Cubesats for Earth Observation Applications in South Africa, in Photogrammetric Engineering and Remote Sensing, Vol. 86, June 2020, pp. 334-340.

The UNOOSA has always acted supportively to the widespread development of small satellites, including cubesats, including them in the *Access to Space for All* initiative, that strives to grant access to space to developing and emerging countries. In the same line, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) has acknowledged that technological progress has made the manufacturing, launch and operation of small satellites increasingly affordable, playing an important role in fostering the development of space activities.[5]

1.2. The new frontiers of launching operations

One of the key elements that has attracted massive attention towards cubesat technology is its capacity to exploit new techniques for launching satellites into orbit. Launching operations have always entailed a huge amount of money and expertise to be properly performed and facilities and vehicles capable to perform such activities are still numerically limited. Due to their volume, "normal" satellites are launched individually, with one space vehicle per satellite. Contrariwise, their small size and weight enable cubesats to "piggyback" on rockets and accompany orbiters travelling to outer space. This allows to deploy cubesats as side cargo sharing a rocket with a larger space object, so to say "hitching a ride" when the launch vehicle capacity is not completely filled, thus consistently cutting the costs related to launch. Private companies and governmental entities worldwide started to extensively resort to this technique, recognizing the opportunity of implementing space missions that would not be possible through traditional satellite technology due to the associated high costs.[6] In January 2021, SpaceX performed an unprecedented rideshare launch reaching the record number of 143 small satellites launched in a single mission, with the Falcon 9 vehicle carrying payloads for NASA and other customers from 11 countries.[7]

A further cutting-edge method to put these small satellites into orbit is their deployment from the International Space Station. From a technical viewpoint, the path of cubesats to their target orbit takes place in two main phases: first, they reach the ISS onboard a spacecraft, and secondly, are dropped down to Low Earth Orbit from the concerned ISS module. More specifically, cubesats are transported to the ISS in soft-sided bags by cargo ships taking equipment, food and water, and, at an appropriate time later, are taken out from the Station's cabin to reach the Japanese Experiment Module (JEM), that is currently the only ISS module with the capacity of performing such deployments. There, the JEM Robotic Manipulator System,

5 UN Doc. A/AC.105/1122, 18 April 2017, paras. 208-209.

6 T. Villela, C.A. Costa, et al., Towards the Thousandth CubeSat, cit.

7 https://spaceflightnow.com/2021/01/24/spacex-launches-record-setting-rideshare-mission-with-143-small-satellites/.

a small satellites ejecting system developed by JAXA, aims the cubesats at their planned orbits and releases them.
Deployments from the ISS present several advantages compared to piggyback launches, including the possibility to choose the best timing of the small satellite's release without affecting that of the main satellite. Furthermore, the ISS provides the additional benefit of having regularly scheduled cargo resupply flights onboard which the small satellites can travel. A flagship company undertaking this activity is Nanorack, that offers the commercial satellite deployment of cubesats, microsats and larger smallsats from the ISS. The Nanoracks CubeSat Deployer (NRCSD) is a cubesat deployer system in operation since 2014, that has launched more than 300 satellites from the Japanese Experiment Module of the ISS as of the end of 2021.[8]

2. Cubesats as space objects: a legal perspective

When it comes to analysing legal challenges connected to cubesats, a necessary premise deals with their qualification as "space objects", that automatically triggers the application of relevant provision of international, and national, space law. As discussed above, cubesats are the tiniest of the satellites belonging to the category of small satellites. The definition of these latter as space objects has raised some issues on the ground that they do not possess all the physical and technical characteristics of traditional bigger satellites. In particular, it has been argued that their incapability of being manoeuvred has potential consequences in terms of State's responsibility and liability, especially in relation to their less precise orbital fidelity and the more limited orientation control and pointing precision, leading to increased risk of conjunctions in orbit and of creating space debris.[9]
In this sense, in 2015 COPUOS has introduced *General exchange of views on the application of international law to small-satellite activities* as a single item for discussion on the agenda of the Legal Subcommittee (LSC), considering that

> "small satellites are particularly important in fostering space activities in countries with budding space programs. As a result, many aspects associated with the deployment of small satellites need to be further assessed, inter alia: the application of registration practices to small satellites, particularly those operated by individuals; the applicability of the Liability Convention to incidents related to small satellites; and the impact of small satellite activities on the long-term sustainability of outer space activities."[10]

8 https://nanoracks.com/products/iss-launch/.
9 S. Mosteshar, I. Marboe, Authorisation of Small Satellites under National Space Legislation, in I. Marboe (ed.), Small Satellites, cit., pp. 129-153, p. 130.
10 UN Doc. A/AC.105/C.2/2015/CRP.23/Rev.1, 22 April 2015, para. 4.

Some delegations in COPUOS have underlined that, notwithstanding that small satellites activities have to comply with the current legal framework, eventual *ad hoc* rules may be discussed to deal with their specific features.[11] However, despite some tendencies to argue that special rules need to be developed for these satellites, it is a shared view that small satellites, including cubesats, should not be seen differently than bigger ones in terms of regulation.[12] Indeed, the UN space treaties do not make any distinction between small and big satellites and only refer to "space objects" without any further specification. In the same sense, they neither consider the manoeuvrability of such satellites as a condition for their application. This does not mean that further clarifications may not be needed. For instance, in 2015 The Netherlands expanded by decree the scope of its 2007 *Space Activities Act* for applying it also to unguided satellites.[13]

In addition, since these activities often involve actors that are not very familiar with the legal regime governing space activities (e.g. universities, private companies), there has been concern that they are not always conducted in full compliance with the current international legal framework. It is precisely for this reason that UNOOSA and the International Telecommunication Union (ITU) have prepared the *Guidance on Space Object Registration and Frequency Management for Small and Very Small Satellites*, in which they reiterate the application of relevant provisions of international space law to small satellites.[14]

11 Draft report, Legal Subcommittee, Sixtieth session, Vienna, 31 May-11 June 2021, A/AC.105/C.2/L.314/Add.2, paras. 12-26.

12 S. Freeland, A Delicate Balance: Regulating Micro Satellite Technology in a Big Satellite World, in University of Western Sydney Law Review, 18, 2015; see also F. von der Dunk, Liability for Damage Caused by Small Satellites –A Non-Issue?, in I. Marboe (ed.), Small Satellites, cit., pp. 154–173; N. Palkovitz, Regulating a Revolution: Small Satellites and the Law of Outer Space, in Aerospace Law and Policy Series, 17, Alphen Aan Den Rijn, 2019.

13 The 2007 Dutch Space Activities Act ('Rules Concerning Space Activities and the Establishment of a Registry of Space Objects') indeed did not require registration of unguided satellites. The Decree of 19 January 2015 provides that "The Space Activities Act also applies to the control from the Netherlands of an unguided space object in outer space by means of a communications link"; S. Mosteshar, I. Marboe, *Authorisation of Small Satellites under National Space Legislation*, in I. Marboe (ed.), *Small Satellites*, cit., pp. 129-153, p. 130; T. Masson-Zwaan, *Registration of Small Satellites and the Case of The Netherlands*, in I. Marboe (ed.), *Small Satellites*, cit., pp. 174-194.

14 UN. Doc. A/AC.105/C.2/2015/CRP.17, 13 April 2015.

3. Legal issues of deployments from the ISS

3.1. The framework

legal regime governing outer space activities. In particular, when it comes to projects involving deployments from the ISS there are several provisions that assume remarkable relevance, in the framework of the UN space treaties and the 1998 Intergovernmental Agreement (IGA) governing the ISS. These provisions are to be read in the face of the concrete situation posed by cubesats deployment, namely that small space objects reach their target orbit departing from an already orbiting object, i.e. the ISS, with relevant implications on the identification of the States that may bear legal consequences therefrom.

The architecture underlying the UN space treaties puts at its centre the identification of the State owing the obligations contained therein. Article VI of the 1967 Outer Space Treaty (OST) provides that States bear international responsibility for "national activities" in outer space, whether carried out by governmental or non-governmental entities. This kind of responsibility is to be interpreted as general accountability, encompassing all the legal consequences of national activities in outer space.[15] This provision appears to be highly relevant for the purposes of cubesats activities, that are often carried out by non-governmental entities, and should be read coherently with the two following provisions, Articles VII and VIII dealing with liability and jurisdiction respectively.[16]

Article VII provides for the liability of the launching State for damages caused by its space object. The 1972 Liability Convention (LIAB) broadened the content of Article VII OST, providing for two different regimes depending on the location in which the damage has occurred: a) absolute liability in case of damages caused by a space object on the surface of the Earth or to aircrafts in flight; b) liability by fault for damages caused elsewhere than on Earth surface, i.e. in outer space. Liability is borne by the launching State, defined in Article I LIAB as the State that launches, procures the launch, the State from whose territory, or the State from whose facility an object is launched. The Convention also contemplates the case of joint launches, in which more than one State fits the definitions of Article I. In that case, all the launching States are jointly and severally liable to provide compensation for the damage caused. With a markedly victim-oriented character, the LIAB provides therefore a regime in which the damaged third party is allowed to ask for the entire compensation to any of the launching States jointly and

15 S. Marchisio, The Evolutionary Stages of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), in Journal of Space Law, 2005, pp. 219-242.

16 S. Marchisio, *The Law of Outer Space Activities*, Rome, 2022, p. 115 ff.

severally liable, notwithstanding the possibility for them to ask for indemnification to the other launching States.[17]

In its turn, Article VIII of the OST provides the obligation of registering space objects in a national registry and to the UN and attributes to the State of registry jurisdiction and control over the registered objects. In this sense, registration operates as a "connecting factor" for the identification of the legal system that governs the space object and personnel thereof.[18] Registration of the objects launched in outer space has been first mentioned in UN General Assembly (UNGA) Resolution 1721 B (XVI) of 21 December 1961, and further detailed by the 1975 Registration Convention (REG). The obligation to register a space object, is owed by the launching State as defined by Article I of the Convention, which reiterates the four categories identified in Article I LIAB. The REG also envisages the possibility of joint launches, requiring the involved States to agree on which of them will register the object. Double registration is indeed forbidden by the Convention.

In the case of cubesat projects that involve more than one State, that is a frequent situation, it is necessary to assess which are the States involved that may fall under the scope of Articles I of LIAB and REG, bearing the obligations mentioned above as "launching States".[19] In addition, as we are dealing specifically with launches from the ISS, the legal framework governing it comes into play. The ISS is regulated by a multi-layered legal regime, with at its top the Intergovernmental Agreement concluded in 1998 by the ISS Partner States, namely the US, Canada, Japan, and eleven Member States of the European Space Agency (ESA) (Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, the UK, and Switzerland).[20] The IGA addresses a number of legal issues, including the obligation for each Partner to register its launched module, criminal jurisdiction, intellectual property, and operational responsibilities. The

17 See L.J. Smith, A. Kerrest, *Article V (Joint Launch/Joint and Several Liability)*, in S. Hobe, B. Schmidt-Tedd, K. Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. II, 2013, p. 144 ff.

18 S. Marchisio, The Law of Outer Space Activities, cit., p. 148.

19 A further issue concerns the disharmony between the use of the expression "launching State" in LIAB and REG and that of "launching authority" in the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, entitled to receive notifications of space objects landed in the territory of other States parties or in areas beyond national jurisdiction, and assistance for their rescue. In the past, the launching State, the State of registry and the launching authority coincided, but this may be no longer the case today for joint launches.

20 S. Aoki, Analysis of the Legal Instruments Operating the ISS as the Most Complex Space Program Ever Undertaken: from Historical Perspective, in Proceedings of the International Institute of Space Law, The Hague, 2014, pp. 367-382; J.M. de Faramiñán Gilbert, The International Space Station: Legal Reflections, in Ordine internazionale e diritti umani, 2018, pp. 49-54.

Partner States then concluded Memoranda of Understanding, laying at the core of the ISS legal governance. This framework is then complemented by a third level of implementing arrangements between the same entities, while further down in the hierarchy are the contracts and sub-contracts to involve private companies in developing and building the Station. According to this framework, Partner States exercise jurisdiction and control over the module they have registered, consistently with Article VIII OST.[21]

3.2 Specific facets

The technical characters of two-stage deployments from the ISS imply relevant legal consequences as multiple States are involved in such operations: the State that procures the launch of the satellite; the State launching the vehicle that delivers the cubesat onboard the ISS; that sovereign on the territory from which the rocket's launch has taken place; the State exercising jurisdiction and control over the module from which the deployment is performed.

What seems crucial in assessing which are the States potentially invested of the legal effects of the provisions addressed above, as launching States, is the identification of which of the two stages can be qualified as the moment of the launch of the space object. The States involved as launching States may indeed vary depending on whether we consider "launch" the lift-off from the Earth of the rocket bringing the cubesat onboard, or the operations through which it is released from the ISS to reach its target orbit.

The UN space treaties have not attempted to describe what is to be intended as "launch" of a space object. National legislation has sometimes provided a definition of launch,[22] generally referring to a launch phase starting from rocket lift-off and ending with its separation from the payload, and often associating it with the moment from which space operations become irreversible.[23] These definitions may not completely fit new trends, including piggy-back launches and deployments from orbiting objects as the ISS, that may put at the test the traditional conception of launch the space community is used to, i.e. operations starting from a launching station on the Earth. In

21 A specific regime is instead provided by the IGA for criminal jurisdiction; F.G. von der Dunk, M.M.T.A. Brus (eds.), *The International Space Station. Commercial Utilisation from a European Legal Perspective*, Leiden, 2006, p. 21 ff.; see also S. Hobe, *Space Law: A Handbook*, 2019, London, pp. 169-172.

22 This is the case for the US National Aeronautics and Space Act (51 U.S.C. § 50501(5) (2010)), the French Loi n° 2008-518 du 3 juin 2008 relative aux opérations spatiales, the Portuguese Decreto-lei 16/2019, 22 January 2019, and the United Arab Emirates Federal Law on the Regulation of the Space Sector (2019).

23 A. Kerrest, L.J. Smith, *Article I Liability Convention*, in S. Hobe, B. Schmidtt Tedd, K.U. Schrogl, (eds.), *Cologne Commentary on Space Law*, Vol. II, Cologne, 2013, p. 105 ff.

this sense, the notion of launch is to be intended as one of an evolutive character and interpreted taking into account technological evolution.
The issue of the identification of the moment of launch for small satellites deployments has been encompassed by the COPUOS LSC in the *Questionnaire on the application of international law to small satellite activities*. Question 4 indeed asks:

> "4.1 Since small satellites are not always deployed into orbit with dedicated rockets as in the case of larger satellites, there is a need for clarification in the understanding of the definition of 'launch'. When a launch of a small satellite requires two steps – first, launching from a site to an orbit and, second, deploying the small satellite to another orbit – in your view, would the first step be regarded as the 'launch' within the meaning of the United Nations treaties on outer space?".

Although limited in their number, the replies sent so far by Member States answer that the first step (Earth to first orbit) is to be considered as a launch.[24] From the perspective of cubesats' deployments from the ISS, this would mean to identify as launch the phase in which the cubesat is carried in outer space onboard a vehicle and transferred to the ISS. Consequently, the States involved in the launching operations of the vehicle bringing the cubesat to outer space may qualify as launching States, while the State of registry of the ISS module from which the deployment takes place would contrariwise fall short of such a qualification.
A partially different interpretation is given in the context of the practice of registration of cubesats deployed by the ISS at the UN. The registration forms submitted so far to the Secretary-General, under the REG or Resolution 1721, have been provided by the States that have procured the launch of the cubesats, and all indicate as the location of launch the ISS itself and as the time of launch that of deployment.[25] The cubesat is therefore rather considered as a cargo onboard the vehicle until it is deployed from the ISS. The identification of the location of launch with an already orbiting object is a new perspective compared to traditional launches, especially with regard to the potential qualification of the State of registry of the concerned module as a launching State under the UN treaties. Coming back to Article I LIAB and REG providing the four categories of launching States, it should be denied that the State of registry of the ISS module can qualify as the State from whose territory an object is launched, as outer space is an area beyond

24 Replies have been received by Austria, Germany and UNISEC-Global (A/AC.105/C.2/2018/CRP.10, 6 April 2018), Brazil (A/AC.105/C.2/2018/CRP.17, 11 April 2018), Brazil and Czechia (A/AC.105/C.2/2019/CRP.8, 29 March 2019), Armenia and Indonesia (A/AC.105/C.2/2019/CRP.15, 1 April 2019).

25 See *inter alia* ST/SG/SER.E/718, 11 August 2014; A/AC.105/INF/429, 26 April 2017; A/AC.105/INF/433, 24 January 2019; ST/SG/SER.E/888, 29 April 2019.

national jurisdiction.[26] Rather, under the IGA, the State of registry of each module retains jurisdiction and control thereon,[27] in accordance with Article VIII OST and II REG, so that ISS modules would be better considered as a "facility" under Article I LIAB and REG. Considering the ISS module as a "facility" would imply that the State that has registered that module could be considered as a launching State.[28]

4. The UNOOSA/JAXA KiboCube Programme

The UNOOSA/JAXA KiboCube initiative constitutes one of the most relevant examples of exploiting the opportunities provided by deployments from the ISS.[29] UNOOSA and JAXA have provided a detailed framework for the delivery of the programme, that is open to entities located in developing countries that are members of the United Nations.[30] Consistently with the objectives of the programme to enhance access to outer space and capacity-building, eligible entities may be research institutes, universities, and other public organizations, while private companies, non-governmental or non-profitable agencies are ineligible.

After the selection, the chosen entity has to conclude an appropriate contract with UNOOSA and JAXA and shall bear the costs of designing, analysing, manufacturing, testing and operating the selected cubesat, including tracking control and data acquisition after its deployment. Conversely, JAXA will bear the costs associated with launch and deployment from the ISS and will provide the selected entity with technical support during the development of the object, while administrative support will be furnished by UNOOSA.

26 Similar issues were raised with regard to launches performed by the Sea Launch corporation from a converted oil rig in the high seas, see M.J. Sundahl, *Legal Status of Spacecraft*, in R.S. Jakhu, P.S. Dempsey, *Routledge Handbook of Space Law*, New York, 2017, pp. 42-59 at 50-52; A. Kerrest, *Launching Spacecrafts from the Sea*, in G. Lafferranderie, D. Crowther, *Outlook on Space Law over the Next 30 Years*, The Hague, 1997, pp. 217-235.

27 On jurisdiction in the IGA see M.J. Sundahl, *Legal Status of Spacecraft*, cit., p. 48 ff.

28 What would also remain to be assessed is the qualification of the other ISS partner States, as the registration forms so far only indicate as location of launch "International Space Station" as a whole. In this sense, it should be noted that the IGA regulates the use of the Station by third parties, providing for the approval of the Partner States.

29 KiboCUBE: The Cooperation Programme between UNOOSA And JAXA on Cubesat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo), United Nations, Vienna, 2020.

30 With regard to the identification of "developing countries" to which the eligible entities may belong, in the absence of a general definition of this category, UNOOSA and JAXA have clarified that they will resort to the list of developing countries indicated in the joint report, World Economic and Situation Prospects published by United Nations Department of Economic and Social Affairs.

Registration of the cubesat is also dealt with in the contract concluded by the three actors involved. Accordingly, the country in which the selected entity is incorporated will register the cubesat under the Registration Convention, or, if not a party to this latter, in accordance with Resolution 1721B (XVI). In addition, the selected entity will enter into an arrangement with JAXA to resolve any and all practical, logistical, technical and legal issues related to the deployment of the cubesat from Kibo. The arrangement will address *inter alia* the necessary conditions for the deployment, allocation of costs, declarations of immunity and hold harmless on the part of JAXA, cross-waivers of liability for damages sustained by either party, third party liability claims, registration and apportionment of other responsibilities arising under the UN space treaties, as well as dispute settlement procedures. JAXA further specifies that "articles set forth in the IGA, including but not limited to the Cross-Waiver of Liability, shall be applied to the Selected Entity through this arrangement (contract)."[31]

Starting with the first deployment performed in 2018 for the Kenyan 1KUNS-PF, the first space object of that African country, the regulatory architecture of the KiboCube programme has allowed to perform six rounds of selection so far, confirming that the agreed definition of legal issues among the parties involved helps secure the consistency of new activities with the legal framework governing outer space activities.

5. Concluding remarks

The number of States involved in the deployment of cubesats from the ISS is highly variable depending on the circumstances of each launch and project and implies a potential multiplying effect on the States qualified as "launching States" under the space treaties. In such an intricate context, the apportionment of the duties, obligations and burdens deriving from these latter between the States concerned becomes of paramount importance. Such an apportionment has been recommended several times by the United Nations with regard to both the liability issues and the registration of space objects in case of joint launches, including in UNGA Resolution 59/115, *Application of the concept of the "launching State"* of 10 December 2004.

With regard to registration of objects deployed from the ISS, practice shows that the State procuring the launch of the cubesat registers it at the UN. While it is undisputed that this State qualifies as launching State, bearing the legal consequences deriving thereof, further clarifications may be needed with regard to the other States involved, as those performing the delivery of the object to the ISS and that exercising jurisdiction and control on the module

31 United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) "KiboCUBE", Fifth Round, Announcement of Opportunity, 26 March 2019.

from which the cubesat is released. In the face of new projects involving deployments of space objects from already orbiting stations, as is the case for planned and future endeavours for the exploration of celestial bodies, identifying the States bearing the related obligations will be extremely relevant in ensuring compliance with the current legal framework.