

Glances at Currently Debated Issues Related to the Registration of Secondary Payloads and the Future of Registration

*Elina Morozova & Yaroslav Vasyanin**

Abstract

As fairly noted in the United Nations General Assembly resolutions, since five international treaties on outer space¹ entered into force, tangible changes in space activities have been taking place. These include the continuous development of new technologies that has always been a challenge to international space law. New means of exploration and use of outer space raise a multitude of issues on how the provisions of the United Nations treaties should be applied in the light of new reality. Actually,

* Elina Morozova, Head of International & Legal Service, Intersputnik International Organization of Space Communications, morozova@intersputnik.com. Yaroslav Vasyanin, Legal Counsel, International & Legal Service, Intersputnik International Organization of Space Communications, vasyanin@intersputnik.com.

1 The five United Nations treaties on outer space are: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, adopted by the General Assembly in its resolution 2222 (XXI) on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967 (Outer Space Treaty), Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space adopted by the General Assembly in its resolution 2345 (XXII) on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968 (Rescue Agreement), Convention on International Liability for Damage Caused by Space Objects adopted by the General Assembly in its resolution 2777 (XXVI) on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972 (Liability Convention), Convention on Registration of Objects Launched into Outer Space adopted by the General Assembly in its resolution 3235 (XXIX) on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976 (Registration Convention), and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies adopted by the General Assembly in its resolution 34/68 on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984 (Moon Agreement).

exactly this everlasting process encourages such a traditional area of law to keep pace with progress of engineering.

The Registration Convention, which has recently celebrated its 40th anniversary of entry into force, is not an exception. Some are certain that the Convention is the source of international space law needed most of all as every other day governmental agencies and non-governmental entities launch space objects into outer space. Under the Registration Convention, every such object is to be registered. The emergence of new types of launched spacecraft and space-based systems poses the questions whether such latest technical advances can be considered space objects in terms of the Registration Convention and, therefore, need to be registered, and if so – how exactly it can be done.

This paper aims to address some debated issues related to the registration of secondary payloads and, paying tribute to the anniversary of the Registration Convention, share some considerations about the future of registration.

I. Introduction

The history of the registration of space objects started less than five years after the first artificial satellite Sputnik 1 had been launched into an elliptical low Earth orbit in 1957. In 1961, it was the United Nations General Assembly Resolution 1721 (XVI)² that established the first international registry of objects launched into outer space and called upon spacefaring states to furnish information for the registration of their launchings to the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). Even though the General Assembly used the wording “registration of launchings”, the registry contained information on space objects only and was mentioned as a “public registry of objects launched into orbit or beyond”.³ Few years later, in 1963, the Declaration of Legal Principles⁴ drafted by the General Assembly introduced a national (domestic) registry of space objects and set forth that the state on whose registry a space object was carried should retain jurisdiction and control over such object. Hence, the first provisions on space objects’ registration at both domestic and international levels had come into force before the United Nations treaties on outer space were adopted.

As the next step, the General Assembly recommended that legal principles governing the states’ activities in the exploration and use of outer space be

2 Resolution 1721 (XVI) adopted by the General Assembly on 20 December 1961 on international cooperation in the peaceful uses of outer space (Resolution 1721 (XVI)).

3 See, for instance, Resolution 1963 (XVIII) adopted by the General Assembly on 13 December 1963 on international cooperation in the peaceful uses of outer space (Resolution 1963 (XVIII)) where a public registry of objects launched into orbit or beyond was noted.

4 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space adopted by the General Assembly as Resolution 1962 (XVIII) on 13 December 1963 (Declaration of Legal Principles).

shaped in the form of an international agreement⁵ and adopted, in 1966, the Outer Space Treaty – the first and the core international agreement on outer space. Its Article VIII restated that jurisdiction and control over a space object should be retained by the state on whose registry the object was carried. Article XI of the Treaty encouraged states to provide the Secretary-General of the United Nations (Secretary-General) with information concerning their space activities, including the registration aspects.

The Registration Convention, which was the fourth and long-expected United Nations international treaty dedicated to outer space, is the most significant legal instrument regulating the registration of space objects. It was adopted in 1974 and implemented the desire of the state parties to establish a means of identifying space objects and creating a link between such objects and states, which bear international responsibility and liability for them. The Convention established a two-level registration system⁶ consisting of national (domestic) registries and the United Nations Register of Objects Launched into Outer Space.⁷ First, a space object launched into Earth orbit or beyond is to be registered by its launching state by means of the object's entry in the appropriate national registry, which needs to be maintained by the launching state.⁸ Any state on whose registry a space object is carried is considered the state of registry⁹ and is then required to provide information regarding this object to the Secretary-General for its inclusion in the United Nations Register.¹⁰

In the process of space objects' registration, it became clear that there was a pinch of ambiguity in some provisions of the Registration Convention, which needed clarification. The same was required by a continuous development of new technologies and the emergence of new space activities. Therefore, since 2004, the United Nations General Assembly has adopted a few resolutions

5 See paragraph 1, part I of the Resolution 1963 (XVIII).

6 Formally, only the first, "national", stage can be named "registration", while the second, "international", stage should be referred to as "notification". However, some documents, including official ones, use the word "registration" to describe submission of information to the Secretary-General. See, for instance, Resolution 62/101 adopted by the General Assembly on 17 December 2007.

7 Actually, two separate registers of objects launched into outer space exist: one is established pursuant to the Resolution 1721 (XVI) (Resolution Register) and the other one is based on the Registration Convention (Convention Register). States that have ratified or acceded to the Registration Convention use the mechanism established by the Convention, and states that are not yet parties to the Convention are welcome to provide information in accordance with the Resolution 1721 (XVI). The two registers are complementary in their nature.

8 See Article II of the Registration Convention.

9 See paragraph c, Article I of the Registration Convention.

10 See Article IV of the Registration Convention.

with a number of recommendations relating to the space objects' registration procedure.¹¹

II. Registration of Secondary Payloads

The continuous search for more accessible ways of exploring and exploiting outer space led, more than four decades ago, to the emergence of the so-called secondary payloads. These include hosted and dispensed payloads, whose technologies can be combined. Today, major space engineering manufacturers and satellite fleet operators widely promote secondary payloads' construction and utilization that have already become a sought-after means of space activities.

The mission of secondary payloads is supported by a host satellite meaning that a payload operator does not incur expenses such as the launch, insurance, and operation of a spacecraft, resulting in significant cost savings. A payload operator is not required to develop an entire space system, while placing a secondary payload on a host platform takes a fraction of time and can be done a year or even six months before the launch. Secondary payloads reduce other risks associated with a space program, such as shortage of funding and out-of-schedule delays. Also, secondary payloads help to create a more distributed architecture for space assets by using multiple satellite platforms and orbital locations.¹²

Usually, these are commercial spacecraft platforms that serve as hosts, while secondary payload operators, on the contrary, are infrequently commercial entities. Indeed, the concept of secondary payloads has been developed in order to allow governmental agencies and not-for-profit organizations to benefit from a more flexible access to space on a timely and cost-effective basis. Commercial satellite operators, in turn, are willing to provide tremendous value to such users on a mutually beneficial basis.

Cooperation between private and public sectors in using secondary payloads brings up a set of questions. For instance, in which particular manner a secondary payload's host and an operator formalize their interaction and what are their reciprocal rights and obligations; whether a payload's operator is somehow involved in the process of manufacturing, launch, and in-orbit

11 These Resolutions are: Resolution 59/115 adopted by the General Assembly on 10 December 2004 on the application of the concept of the "launching State" (Resolution 59/115), Resolution 62/101 adopted by the General Assembly on 17 December 2007 on recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects (Resolution 62/101), and Resolution 68/74 adopted by the General Assembly on 11 December 2013 on recommendations on national legislation relevant to the peaceful exploration and use of outer space (Resolution 68/74).

12 See more on the official website of the Hosted Payload Alliance at <http://www.hostedpayloadalliance.org>.

delivery of the main space mission; whether a host's operations, such as a satellite's relocation, require prior approval of the payload's operator or are otherwise limited. All these and other related questions undoubtedly deserve a detailed consideration. However, this paper is primarily focusing on registration aspects.

II.I. Hosted Payloads

The term "hosted payload" refers to an additional device, which is integrated into a spacecraft and belongs to a person other than the spacecraft's owner. This device can be a sensor, instrument, transponder, or another space-bound item serving a particular purpose that differs from the main mission of the spacecraft. Generally, hosted payloads operate independently of their host spacecraft, but share spacecraft's resources, such as power supply and communications facilities, and in some cases, ground systems. At the same time, a hosted payload operator does not own the host spacecraft itself and has no operational control over it. Hence, hosted payloads and their operators are hugely dependent on the primary space missions.

The history of hosted payloads started in 1976 with the launch of three identical Marisat F1, Marisat F2, and Marisat F3 spacecraft, which were the first maritime telecommunications satellites designated to provide services for commercial shipping. Each satellite carried an additional ultra-high-frequency (UHF) hosted payload that was designed as a "gap filler" to support the United States Navy needs.¹³ All three satellites were registered by the United States of America – the first two in accordance with the Resolution 1721 (XVI) and the third one in accordance with the Registration Convention.¹⁴ However, none of the hosted payloads has been registered or even mentioned in the information provided to the United Nations. This brings us to the question of whether hosted payloads require registration.

The Registration Convention demands that a space object launched into Earth orbit or beyond be registered. The term "space object" is defined by stating that it includes component parts of a space object as well as its launch vehicle and launch vehicle's parts.¹⁵ Therefore, it needs to be established

13 See more on the Marisat-series satellites in NASA Space Science Data Coordinated Archive available at <http://nssdc.gsfc.nasa.gov/nmc/SpacecraftQuery.jsp>.

14 Letter dated 10 May 1976 from the Permanent Representative of the United States of America addressed to the Secretary-General, A/AC.105/INF.344 dated 18 May 1976; Letter dated 4 November 1976 from the Permanent Representative of the United States of America addressed to the Secretary-General, A/AC.105/INF.351 dated 17 November 1976; Letter dated 31 March 1977 from the Permanent Representative of the United States of America addressed to the Secretary-General, ST/SG/SER.E/1 dated 14 April 1977.

15 See paragraph d, Article I of the Liability Convention and paragraph b, Article I of the Registration Convention.

whether a hosted payload should be considered a separate space object or a component part of the host spacecraft.

A physical approach to the question of a “component part” seems to be generally accepted. This means that component parts of a space object would include all elements regarded as making up the space object. Even though, a hosted payload has technical and property self-sufficiency and even its own mission in space, such a mission can not be carried out by a hosted payload itself, which is physically tied to and operationally dependent on the host platform and constitutes its portion actually. Therefore, in the context of the Registration Convention, a hosted payload can hardly be considered a separate space object, meaning that its individual registration is not required. However, it is not only the letter of the Registration Convention, but also its primary aim that should be followed. The latter is described as the desire of states to create a link between space objects and states bearing international responsibility and liability for them. In order to assess whether the aim of the Registration Convention would be respected if hosted payloads are not registered, the following two scenarios may be considered.

Under the first scenario, a host and a hosted payload have the same “nationality”. Apart from the Marisats case, where the satellites were registered with the United Nations by the USA and the UHF hosted payloads were operated by the United States Armed Forces, other recent examples of the first scenario can also be given.

In 2009, satellite operator Intelsat S.A. launched its Intelsat 14 satellite. Apart from C- and Ku-band transponders, the satellite carries an Internet Routing in Space (IRIS) payload designed to serve the interests of the United States Department of Defense and the United States Strategic Command. The USA performed all the actions necessary in accordance with the Registration Convention with regard to the satellite but has not provided any information on the IRIS payload.¹⁶

A similar case occurred in 2011, when the SES-2 satellite with a Commercially Hosted Infrared Payload (CHIRP) on board supplemented the SES S.A. space fleet. The CHIRP program had been developed by SES Government Solutions and the United States Air Force.¹⁷ SES-2 was duly registered by the USA, which, however, has not furnished the United Nations with information on the hosted payload.¹⁸

16 Note verbale dated 10 September 2013 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/688 dated 22 October 2013.

17 See more on the official website of the SES Government Solutions at <http://www.ses-gs.com/hosted-payloads/>.

18 Note verbale dated 14 November 2011 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/632 dated 12 December 2011.

Two Japanese satellites Hodoyoshi-3 and Hodoyosi-4 were launched in 2014. Both spacecraft are experimental earth-observing microsattellites built by the University of Tokyo and carrying small promotional hosted payloads. Japan, acting as the state of registry, transmitted to the United Nations information on Hodoyoshi-3 and Hodoyosi-4. As in the previous cases, the payloads were not registered separately. However, when describing general functions of the satellites, Japan specified, *inter alia*, that they were carrying hosted payloads using spaces within the spacecraft.¹⁹

Under the first scenario, where a host satellite and a hosted payload have the same “nationality”, a single state (i) bears international liability for the object launched into outer space, as its launching state,²⁰ (ii) exercises jurisdiction and control over the space object, as its state of registry, including both the host and the payload, and (iii) has responsibility for space activities of the host and the payload operators, which are its national entities.²¹ In these circumstances a separate registration of a hosted payload would not result in any legal consequences or practical advantages, and, therefore, seems to be really excessive. At the same time, following the Japanese example, states of registry may be encouraged to submit to the United Nations additional information related to the hosted payloads, which are carried by their space objects. Such practice would undoubtedly be useful for learning more about the states space activities and the space technologies they use.

This recommendation may seem even far more important if the “nationalities” of a host satellite and a hosted payload differ. Let this be the second scenario, which can be illustrated by the following example.

Intelsat 22, another satellite of Intelsat S.A. launched in March 2012, hosted a specialized UHF communications payload integrated into the satellite in the interests of the Australian Defense Force. The USA, being the launching state, registered the Intelsat 22 satellite. In its notification to the United Nations,

19 Note verbale dated 8 January 2015 from the Permanent Mission of Japan to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/737 dated 24 February 2015.

20 Article II of the Liability Convention states that a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight; Article III of the Liability Convention stipulates that in the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

21 Article VI of the Outer Space Treaty specifies that 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 Outer Space Treaty.

the USA did not mention the hosted payload's presence on board of its satellite.²²

Both the USA and Australia can be considered launching states and have international liability for the objects launched into outer space and bear responsibility for space activities of the host satellite and the hosted payload operators, being their national entities. However, this is the USA, which, as the state of registry, retains jurisdiction and control over the whole spacecraft, including the hosted payload operated by the Australian Defense Force.

As operators of hosted payloads are quite often governmental agencies performing military, defense and other similar functions, the issue of jurisdiction and control over their portion of the satellite may become crucial. It is impossible to exercise them unless a hosted payload is registered by the appropriate state separately from the main satellite as a single space object. Also, it might be reasonable that the state responsible for national space activities in accordance with article VI of the Outer Space Treaty include in its domestic registry a space object owned and controlled by its national entity.

Consequently, under the second scenario, separate registration of a hosted payload could have been considered reasonable, however, it is hardly possible according to the letter of the Registration Convention. Therefore, if a space object carries a "foreign" hosted payload, the satellite's state of registry might be highly recommended to furnish the United Nations with additional information specifying the existence of a hosted payload, its operator, and the state responsible for its national activity.

II.II. Dispensed Payloads

Similarly to hosted payloads, dispensed payloads are integrated with a host satellite, which after its launch and release from a launch vehicle carries them to the desired orbit. Then, the host satellite ejects the dispensed payload that powers on and starts its own operations in space. This means that straight after the release dispensed payloads become self-sufficient individual space missions. The main difference between hosted and dispensed payloads is that a hosted payload uses its host's resources on a permanent basis, while a dispensed payload needs a host for the launch and transportation purposes only.

This technology makes the delivery of small-size free-flying spacecraft beyond low Earth orbit affordable. Generally, such spacecraft are operated by non-governmental entities, including universities, education and research institutes, and private industry with limited funds, that could not earlier afford owning a space object. Dispensed payloads give life to a number of small missions, such as minor operational servicing or space science and technology studies, that have not been even thought possible before.

22 Note verbale dated 26 July 2012 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/650 dated 1 August 2012.

Technologically, a launch of a dispensed payload may resemble a dual launch of two co-passengers, as in both cases a launch eventually results in two individual space objects' operating in orbit. Physical independence of dispensed payloads leads to a conclusion that such payloads are to be considered separate space objects, and, therefore, require separate registration. A few examples of such registration already exist.

In 1995, Sich-1, a Ukrainian spacecraft, was launched into outer space and carried Fasat-A designated to become the first Chilean satellite. The mission was unsuccessful. The payload failed to separate from Sich-1 and remained coupled with the host. Sich-1 was officially registered by Ukraine.²³ Chile, in turn, furnished the United Nations with the information on Fasat-A specifying that its launch had failed.²⁴ It is noteworthy that information on the Fasat-A satellite can also be found in the Supplementary Registry of Space Objects held by the United Kingdom of Great Britain and Northern Ireland, since Fasat-A was constructed in cooperation with a British company. From the viewpoint of registration, this is a good example to follow.

Quite recently, in 2013-2014, Italia's Unisat 5 and Unisat 6 satellites were the host platforms for the release of nine and four small secondary payloads, respectively. Italy mentioned all these payloads when submitting to the United Nations information on its space objects.²⁵ Most of such dispensed payloads were also registered by the appropriate states: for example, ICUBE-1 – by Pakistan, Lemur-1 – by the USA, and WREN – by Germany.²⁶ The other payloads released from Unisats remain unregistered.

The above separate registration approach can also be supported by the Resolution 62/101, which notes that in the case of a joint launch, each space object should be registered separately and that space objects should be included in the appropriate registry of the state responsible for their operation.²⁷ Also, the Working Group on the Practice of States and International Organizations in

23 Note verbale dated 22 September 1995 from the Permanent Mission of Ukraine to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/291 dated 12 October 1995.

24 Note verbale dated 13 December 2012 from the Permanent Mission of Chile to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/660 dated 26 February 2013.

25 Note verbale dated 7 November 2014 from the Permanent Mission of Italy to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/734 dated 19 December 2014.

26 Note verbale dated 1 April 2014 from the Permanent Mission of Pakistan to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/708 dated 10 April 2014; Note verbale dated 5 February 2015 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/739 dated 23 July 2015; Note verbale dated 25 June 2014 from the Permanent Mission of Germany to the United Nations (Vienna) addressed to the Secretary-General, ST/SG/SER.E/720 dated 7 July 2014.

27 See paragraph 3 (c) of the Resolution 62/101.

Registering Space Objects advised that satellites should be included on a registry of the state of the satellite's owner and/or operator because that state was best positioned to exercise jurisdiction and control.²⁸

II.III. More Complicated Cases: Multi Hosting and Space Travelling

Both hosted and dispensed payloads have been utilized for quite a long time and, therefore, have every reason to be considered present-day reality. However, continuous work on improving spacecraft's architecture challenges international space law with even more complicated questions involving the use of secondary payloads.

In 2017, satellite operator SES S.A. is going to launch its SES-16. The spacecraft will feature a special port that allows a hosted payload to dock with it in orbit. The hosted payload will be launched later on a future SES satellite, which will release the payload in the vicinity of SES-16. Then the payload will travel to the "home" satellite and attach itself. To put it differently, the SES-16 case implies that a single secondary payload will utilize two hosts – one for the launch and in-orbit delivery and the other one for the main space mission. Therefore, such a secondary payload is actually a combination of both hosted and dispensed technologies.

From the legal viewpoint, the future SES-16 secondary payload can be considered a separate space object and, therefore, needs to be registered. However, what registration information exactly is to be provided to the Secretary-General? Is the state of registry required to specify both hosts of the payload – the first, when describing the payload's launch, and the second, when describing the payload's basic orbital parameters? Probably, all this information might be submitted as additional data to give a clear understanding and a good reasoning for a hosted payload, being tightly connected to SES-16, to be considered a separate space object.

Recently, the Defense Advanced Research Projects Agency (DARPA), an agency of the United States Department of Defense responsible for the development of emerging technologies, has run the Phoenix Project aimed at creating a new modular satellite system. This system seeks to develop an innovative robotic technology that would be able to provide space objects' assembly, repair, and life extension functions in outer space. Firstly, the payload delivery system will carry separable elements, called satlets, to orbit. Then, small independent modules will be attached in necessary combinations to various satellites located in different orbital slots and even orbits.²⁹

28 Report of the Chairman of the Working Group on the Practice of States and International Organizations in Registering Space Objects, Annex III to the Report of the Legal Subcommittee on its forty-fifth session held in Vienna from 3 to 13 April 2006, A/AC.105/871 dated 24 April 2006.

29 See more on the official website of the DARPA at <http://www.darpa.mil/program/phoenix>.

GLANCES AT CURRENTLY DEBATED ISSUES RELATED TO THE REGISTRATION
OF SECONDARY PAYLOADS AND THE FUTURE OF REGISTRATION

The Phoenix Project is at an advanced stage and the demonstration of the satlets technology is scheduled for 2017 with the launch of DARPA's eXCITE (eXperiment for Cellular Integration Technologies) spacecraft. Satlets need to prove their ability to withstand launch environment, perform and maintain thermal control, communicate with the ground, reconstitute traditional spacecraft bus capability, and support a simple and a complex payload.³⁰

From the viewpoint of the registration regime, the Phoenix Project is both exciting and challenging, since the new modular satellite system implies a multitude of secondary payloads travelling in outer space and changing their hosts. Unlike traditional dispensed payloads, being self-sufficient individual space missions, satlets are basically spare parts of a larger spacecraft, which is already in orbit or is to be assembled there. Therefore, if a physical approach to the space object is applied, a satlet can not be considered a separate space object. However, each satlet may be launched, delivered, and integrated separately. In that way such an approach will not follow the spirit of the Registration Convention, whose main purpose is to establish a means of identifying space objects and creating a link between such objects and states, which bear international responsibility and liability for them.

The satlets' registration issue is just a part of a wide range of questions raised by the current development of new modular satellite architectures offering their further in-orbit servicing. Today, this field of space engineering is placed on a wide footing and broadly discussed. Considering that a few projects of this kind are already under construction and even more of them are being designed, the establishment, operation, and maintenance of the new space systems are most likely to become another legal challenge shortly. In 2016, the COPUOS Legal Subcommittee for the first time considered issues related to the application of international law to small satellite activities and noted that such activities needed to be included in the scope of application of international and national regulatory frameworks.³¹ As the work of the Subcommittee on small satellite missions has just started, it might be useful to consider, within the framework of this agenda item, the issues related to secondary payloads and new modular satellite architectures as well.

III. The Future of Registration

Considering the future of registration, one cannot but mention that a number of detailed clarifications and recommendations regarding complicated aspects of the space objects' registration have already been given. Furthermore, the United Nations Office for Outer Space Affairs drafted the Registration

30 See more information on the eXCITE spacecraft at http://space.skyrocket.de/doc_sdat/excite.htm.

31 Report of the Legal Subcommittee on its fifty-fifth session held in Vienna from 4 to 15 April 2016, A/AC.105/1113 dated 27 April 2016.

Information Submission Form, which aims to assist states and international intergovernmental organizations in registering space objects.³² Yet, there is a set of suggestions, outside the letter of the Registration Convention but within its spirit, proposed to improve registration practices.

Firstly, further steps might be taken to raise the level of harmonization of the states' and international intergovernmental organizations' practice in registering space objects, which still differs in a few respects. The amount of registration information ranges from a two-word statement to a detailed account. Some recommendations on the data volume within certain graphs might be made, or even a completed sample registration form might be published. Also, advice might be given as to the scope of additional voluntary information to be reflected in the United Nations Register. This may include, *inter alia*, information on the existence of a hosted payload on board a space object, the release of a dispensed payload, a secondary payload's operator, and the state responsible for its national activity.

Secondly, as is known, the Registration Convention does not set any exact deadline for the presentation of information. As the result, the timeframes for the submission of information vary greatly – from one month to one year. As long ago as in 2005, the COPUOS Legal Subcommittee noted that a reasonable deadline for registering space objects needs to be set,³³ however, the issue is still pending. Fixing a precise timeframe for the submission of information will undoubtedly make it possible to register space objects in a timely and predictable manner.

Thirdly, in order to improve registration practices and increase transparency in outer space activities, states and international intergovernmental organizations might be encouraged to make their domestic registries public. Some states, for instance, the United Kingdom and the USA, hold such registries, which can be easily accessed through the Internet. National registries of other states, for example, Russia, are not public, which makes it difficult to receive information on a number of space objects. This recommendation is not new, as it was given in 2005 at a meeting of the Working Group on the Practice of States and International Organizations in Registering Space Objects and further reported to the COPUOS Legal Subcommittee.³⁴

32 See more about the Registration Information Submission Form on the official website of the United Nations Office for Outer Space Affairs at <http://www.unoosa.org/oosa/en/spaceobjectregister/resources/index.html>.

33 See paragraph 127 of the Report of the Legal Subcommittee on its forty-fourth session held in Vienna from 4 to 15 April 2005, A/AC.105/850 dated 28 April 2005.

34 See paragraph 17 of the Report of the Chairman of the Working Group on agenda item 9 "Practice of States and international organizations in registering space objects", Annex III to the Report of the Legal Subcommittee on its forty-fourth session held in Vienna from 4 to 15 April 2005, A/AC.105/850 dated 28 April 2005.

Then, it has also been suggested that information on space objects to be launched into orbit should be provided. Pre-launch notifications are primarily aimed at ensuring the security of space launches, improving information interaction among states, and increasing the overall confidence and transparency in space activities. In 2006, the International Academy of Astronautics carried out the Cosmic Study on Space Traffic Management, which specified that a pre-launch notification system is necessary for a comprehensive traffic management regime.³⁵ In 2013, the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities reported its conclusions to the United Nations General Assembly, among which the provision, by states, of pre-launch notifications of space vehicle launches and information on the launch vehicles missions was noted.³⁶ Still, it is unclear what international authority can assume obligations of collecting, processing, and keeping such information. The exact procedure of pre-launch notifications also requires clarifications. Finally, the international space community might consider following the approach of the International Telecommunication Union that incorporates its regulations on the utilization of radio frequencies and satellite orbits into a single document – the Radio Regulations. Probably, registration practices of states and international intergovernmental organizations can also be improved by incorporating all the regulations related to the registration of space objects into a single source of information. For instance, the United Nations Office for Outer Space Affairs might consider preparing and eventually adopting a single document retelling all the current regulations on the space objects' registration, including both obligatory and non-obligatory ones, however, in a consecutive manner and being logically divided into theme blocks. Such a document might include comprehensive information on who, when, and in which manner is to proceed with regards to the registration. At the same time, the document would retain a high level of flexibility as it could be easily amended whenever necessary. However, there remains the key question – in what particular manner these and other suggestions must be made to improve registration practices? Since amending the United Nations treaties on outer space requires adoption of a General Assembly resolution and further national ratification procedures, it seems to be next to impossible. Not a single amendment has ever been made since 1967, the fact that speaks for itself. This means that international space law is probably unable to promptly respond to the topical questions raised by the progress of engineering with legally binding instruments.

35 Cosmic Study on Space Traffic Management, 2006, available at <https://iaaweb.org/iaa/Studies/spacetraffic.pdf>.

36 Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, A/68/189 dated 29 July 2013.

Nevertheless, considering how fast new technologies are emerging, how close nations tend to cooperate in their space activities, and how enthusiastic more and more entities are becoming about making business in outer space, one can look at other more flexible but no less efficient solutions. What is meant here is “soft law”. Practices prove that when registering space objects states not only seek to comply with the mandatory rules of international space law but also follow recommendations, guidelines, and other non-legally binding regulations. Therefore, further suggestions, either originating within the walls of the COPUOS Technical and Legal Subcommittees or reviewed upon submission of various permanent and ad hoc working and study groups, and embodied in the General Assembly resolutions might be a sufficient and effective means to improve the registration practice.

IV. Concluding Remarks

In 1958, in its very first resolution on the peaceful use of outer space, the United Nations General Assembly noted that recent developments in outer space had added a new dimension to man’s existence and opened new possibilities for the increase of his knowledge and the improvement of his life.³⁷ Along with that, the General Assembly acknowledged the importance of their efficient regulation and requested the newly established COPUOS to follow legal problems which might arise in this field.

Over nearly six decades, the number of spacefaring states and those, who join the “space club” in cooperation with the space legacies, has increased significantly. Also, the participation of numerous non-governmental entities generating a multitude of commercial contracts with respect to space activities in general and space objects in particular should be noted.

Indeed, the latest technical advances and a rapid commercialization of space activities have constantly been requiring urgent practical solutions and professional advice, and the international legal regime has managed to respond to the challenges. Here it is hard to overestimate the role of the COPUOS, including its Subcommittees and working groups, and their significant contribution to streamlining the registration of space objects. Hopefully, the United Nations, enjoying the indispensable support of the international community, will continue to maintain a stable progress of the international space law and make sure that it keeps pace with the times.

37 Resolution 1348 (XIII) adopted by the General Assembly on 13 December 1958 on questions of the peaceful use of outer space.