



Universiteit
Leiden
The Netherlands

Widening the horizons of outer space law

Masson-Zwaan, T.L.

Citation

Masson-Zwaan, T. L. (2023, February 9). *Widening the horizons of outer space law*. *Meijers-reeks*. Retrieved from <https://hdl.handle.net/1887/3562089>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3562089>

Note: To cite this publication please use the final published version (if applicable).

C:

THE LEGAL FRAMEWORK
FOR SPACE ACTIVITIES:
THE NETHERLANDS

1 INTRODUCTION

The use of small satellites is increasing, their field of application is growing, and the group of actors involved with their construction, launch and use is diversifying. Despite some tendencies to argue that special rules need to be developed for these satellites, the view now seems to be emerging that ‘small’ satellites should not be treated differently than ‘big’ ones in terms of regulation. After all, the UN outer space treaties do not distinguish between small or large satellites, they rather speak of ‘space objects’, without precisely defining them.¹ Neither does it matter for the treaties in which orbits small satellites operate nor whether they are ‘manoeuvrable’ or not. Yet, small satellites present certain characteristics that may require a closer look before applying all the legal requirements that are usually imposed on larger space objects.² Questions about the legal ramifications of small satellites are on the agenda of different forums such as the ITU³ and the UN, and are discussed at many conferences.

Two events held in March 2014 are at the core of this book; one is a symposium organised by the International Institute of Space Law (IISL) with the European Centre for Space Law (ECSL) for the delegates of the Legal Subcommittee of UNCOPUOS,⁴ and the other a conference organised by the University of Vienna. The present chapter, addressing registration of small satellites, is based on a presentation given at the latter.

* *Small Satellites: Regulatory Challenges and Chances*, I. Marboe (ed.), (Brill Nijhoff, 2016), pp. 174-194.

1 On the issue of the (lack of) definition of ‘space objects’ in the UN outer space treaties see the chapter by Frans von der Dunk in this book.

2 See e.g. Tanja Masson-Zwaan, ‘Cubesat regulation in Europe’ in Ruedeger Reinhard and Cem O Asma (eds), *Cubesat Technology and Applications* (VKI Lecture Series 2013) 1-21; Neta Palkovitz and Tanja Masson-Zwaan, ‘Orbiting Under the Radar: Nano-satellites, International Obligations and National Space Laws’ in 2012 *Proceedings of the International Institute of Space Law* (Eleven 2013) 566-78; Neta Palkovitz, ‘Space Entrepreneurship and Space Law- Future Challenges and Potential Solutions’ in 2013 *Proceedings of the International Institute of Space Law* (Eleven 2014) 61-72.

3 See on ITU related issues, Attila Matas and Yvon Henri, ‘ITU Radio Regulatory Framework for Small Satellite Design and Operation’ in 2010 *Proceedings of the International Institute of Space Law* (Eleven 2011) 445-51. See also Sylvia Ospina, ‘Revisiting the Registration Convention: A Proposal to Meet the Need to Know “What is Up There”’ in *Proceedings of the 43rd Colloquium on the Law of Outer Space* (AIAA 2001) 199-209.

4 See the presentations held at the IISL/ECSL Symposium of 2014 at the website of UNOOSA, <http://www.unoosa.org/oosa/en/ourwork/copuos/lsc/2014/symposium.html>.

First, an overview of the legal instruments that are relevant in the context of registration of small satellites is given. Then, the implementation of the obligation to register is addressed, both by the UN and at national level. Next, the practice of launching States of small satellites will be addressed, with a specific focus on the Netherlands, as well as the practice of launch service providers in this context. The need for capacity building about the legal aspects of small satellites is emphasised, to ensure greater awareness among non-traditional actors.

2 RELEVANT LEGAL INSTRUMENTS

Several legal instruments have an impact on the matter of registration of satellites, including small satellites. They are the early UN resolutions, several UN space treaties, as well as a few later UN resolutions. In addition, some practical instruments are relevant, such as the UN online index and the registration form made available by the UN Office for Outer Space Affairs (UNOOSA). National space legislation will also be addressed in this section, mainly focusing on the Netherlands.

2.1 Resolution 1721B (XVI) and Resolution 1962

UN General Assembly resolution 1721B (XVI) on International Co-operation in the Peaceful Uses of Outer Space was adopted on 21 December 1961 and is the first document referring to registration of objects launched into outer space.⁵ The UN General Assembly ‘calls upon States launching objects into orbit or beyond to furnish information promptly to the Committee on the Peaceful Uses of Outer Space, through the Secretary-General, for the registration of launchings’, and ‘requests the Secretary-General to maintain a public registry of the information furnished in accordance with paragraph 1 above’. In fact this resolution is still used as the legal basis to inform the UN of objects launched into outer space, for instance by States that have not ratified the Registration Convention.⁶ The Secretariat of UNOOSA has maintained a registry of launchings since 1962 in accordance with this resolution and information has been issued in UN documents in the A/AC.105/INF series.⁷

5 Text available at http://www.oosa.unvienna.org/pdf/gares/ARES_16_1721E.pdf. A useful online index of all UN General Assembly resolutions relating to outer space is maintained by the UN Office for Outer Space Affairs and can be found at <https://www.unoosa.org/oosa/en/ourwork/spacelaw/resolutions.html>.

6 See below, section 2.3.3.

7 However, the ‘Online Index of Objects Launched into Outer Space’ contains information on satellites launched from 1957 onwards, see <http://www.oosa.unvienna.org/oosa/en/osoindex.html>. Note also that when the Registration Convention entered into force in 1976, another register of launchings was established for information received from parties to that convention.

Another relevant UN resolution from the early days is UN General Assembly resolution 1962 (XVIII). It contains the famous ‘Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space’ that forms the basis of the Outer Space Treaty adopted a few years later. The resolution was adopted on 13 December 1963.⁸ Its Principle 7 reads as follows:

‘The State on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereon, while in outer space. Ownership of objects launched into outer space, and of their component parts, is not affected by their passage through outer space or by their return to the earth. Such objects or component parts found beyond the limits of the State of registry shall be returned to that State, which shall furnish identifying data upon request prior to return.’

These two instruments set the tone for the principles regarding registration of space objects later embodied in the UN space treaties, notably the Outer Space Treaty and the Registration Convention. They clearly do not make any distinction as to the size of the satellites; they apply to small satellites without exception.

2.2 Outer Space Treaty

The Outer Space Treaty⁹ was drafted almost fifty years ago in a field subject to fast and profound technological advances, but its basic provisions are still relevant and are broad enough to address a wide range of space activities.¹⁰ The treaty has 103 parties and 25 signatories as at 1 January 2015. It can be said to have reached the status of customary international law, binding even on States that have not ratified it. Article VIII of the Treaty is the most relevant for registration, and reads as follows:

‘A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer

8 Text available at http://www.oosa.unvienna.org/pdf/gares/ARES_18_1962E.pdf.

9 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, done 27 January 1967, entered into force 10 October 1967, 610 UNTS 205, 6 ILM 386 (1967), hereafter Outer Space Treaty. See for an in-depth discussion, Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Cologne Commentary on Space Law, Vol I* (Carl Heymanns Verlag 2009).

10 See for an excellent analysis of the treaty, Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Cologne Commentary on Space Law, Vol I* (Carl Heymanns Verlag 2009).

space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.'

Thus, as under resolution 1962, the State of registry retains jurisdiction and control over an object launched into outer space and ownership of objects launched into outer space and of their component parts is not affected by their presence in outer space or by their return to earth.

The Treaty also contains rules about responsibility and liability in its Articles VI and VII.¹¹ The provisions on responsibility and liability also have an impact on the registration of small satellites, because the Registration Convention, discussed below, provides that it is one of the launching States that must register the object.

Lastly, Article XI of the Outer Space Treaty is relevant in the context of registration. It states that States should inform the UN, the public and the international scientific community about their space activities to promote international cooperation, and that the UN should disseminate such information. This legal provision is used by the Netherlands to provide information to the UN about space objects, without formal registration as a launching State.

2.3 Registration Convention

The 1975 Registration Convention¹² builds upon Article VIII of the Outer Space Treaty. On 1 January 2015, the Convention had 62 ratifications, 4 signatures and 3 declarations of acceptance by international intergovernmental organisations.¹³ The last entrants were EUTELSAT IGO, which joined ESA and EUMETSAT by making a declaration of acceptance in June 2014, and Kuwait and Colombia which ratified the Convention in 2014.

The Preamble confirms the desire to make provision for national registration by launching States of objects launched into outer space, and for the UN to establish and maintain a mandatory central register of objects launched into outer space. A further desire is to provide additional means and procedures for States to assist in the identification of space objects.

11 See the chapter by Said Mosteshar and Irmgard Marboe and the chapter by Frans von der Dunk in this book.

12 Convention on Registration of Objects Launched into Outer Space, done 14 January 1975, entered into force 15 September 1976, 1023 UNTS 15, 14 ILM 43 (1975), hereafter 'the Registration Convention' or 'the Convention in this section. See for an in-depth discussion, Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Cologne Commentary on Space Law, Vol II* (Carl Heymanns Verlag 2013). See also Frans G von der Dunk, 'The Registration Convention: Background and Historical Context' in *Proceedings of the 46th Colloquium on the Law of Outer Space* (AIAA 2004) 450-53; Maureen Williams, 'The Registration Convention Thirty Years On' in *Proceedings of the 49th Colloquium on the Law of Outer Space* (AIAA 2007) 264-69.

13 Pursuant to Article VII of the Registration Convention.

Article I defines the terms 'launching State', 'space object', and 'State of registry'. The term 'launching State' means: (i) A State which launches or procures the launching of a space object; (ii) A State from whose territory or facility a space object is launched. The term 'space object' includes component parts of a space object as well as its launch vehicle and parts thereof; and the 'State of registry' is defined as a launching State on whose registry a space object is carried in accordance with Article II.

The definition of the term 'launching State' is particularly important with respect to small satellites and their registration, because these satellites will often be operated by a private entity and launched from abroad, and the question will be whether the State where the private operator is located will consider itself as a launching State, for instance as a State 'procuring' the launch. If this is not the case, that State will not have a basis to register the satellite under the Convention, and unless another launching State registers the satellite, it may remain unregistered.

The use of the word 'shall' in Article II implies an obligation; national registration, the setting up of a national registry and informing the UN Secretary-General of the establishment of that national registry are compulsory. Article III in turn obliges the UN Secretary-General to maintain a register that is fully and openly accessible. Likewise, Article IV uses the word 'shall' in obliging the State of registry to furnish certain information to the UN Secretary-General. However, the words 'to the greatest extent feasible and as soon as practicable' weaken that obligation.

The following information concerning each space object that is launched into earth orbit or beyond must be provided:

- Name of launching State(s);
- An appropriate designator of the space object or its registration number;
- Date and territory or location of launch;
- Basic orbital parameters, including:
- Nodal period (the time between two successive northbound crossings of the equator – usually in minutes);
- Inclination (inclination of the orbit – polar orbit is 90 degrees and equatorial orbit is 0 degrees);
- Apogee (highest altitude above the Earth's surface; in kilometres);
- Perigee (lowest altitude above the Earth's surface; in kilometres);
- General function of the space object.¹⁴

The information to be provided is vague and general, and, although useful for identifying the launch of a space object, has limited operational value in determining the position of the space object once initial injection into orbit has been performed.

14 Article IV of the Registration Convention. The explanations of the terms 'nodal period', 'inclination', 'apogee' and 'perigee' are not in the treaty but are provided on the UNOOSA webpage.

Additional information may be provided from time to time, and, again 'to the greatest extent feasible and as soon as practicable', States shall notify the UN of objects that are no longer in orbit.

Under Article VI, a State that suffered damage by an object it has not been able to identify, or which may be of a hazardous nature, may request assistance from other States, especially those that have space monitoring and tracking facilities, to identify the object, in accordance with an agreement between the parties concerned and on equitable and reasonable conditions.

Registration *per se* does not have any consequences for the determination of liability for damage caused by a space object. The 'registration State' and the 'launching State' are not necessarily one and the same. Firstly, the definition of 'launching State' can refer to various different States, such as the State that launches, the State that procures the launch, or the State whose territory or facility is used. Secondly, in case of a joint launch, all 'launching States' shall jointly determine which one of them shall register the object. If damage occurs, the registration State will be the most easily identifiable launching State, but all States that qualify as launching State and all parties to a joint launch are jointly and severally liable. The State that paid compensation can present a claim for indemnification to the other launching States.

Information received in accordance with the Convention has been issued in UN documents in the 'ST/SG/SER.E' series. As indicated, the 'A/AC.105/INF' series contains information provided by States who are not party to the Convention and who notify the UN on another basis, e.g. on the basis of resolution 1721B (XVI). The UNOOSA website states that 'approximately 93% of all functional space objects (satellites, probes/landers, manned spacecraft, space station components, etc.) have been registered with the Secretary-General'.¹⁵

Unfortunately, not all States provide the information they are required to under the Convention, and sometimes, differing information is submitted by different parties. The vagueness of the information to be furnished does not help. It is also confusing that States register objects under different legal instruments – sometimes under the Registration Convention, sometimes under resolution 1721B (XVI), and sometimes on the basis of Article XI Outer Space Treaty. It also happens that several States register the same object, or, worse, that no State does. This is caused by the fact that several States can qualify as a launching State, and thus have a legal basis to register. If they do not agree among themselves which of them will register the object, confusion may arise. Furthermore, the Convention seems to apply only with regard to objects that actually reach orbit, but not to objects whose launch failed. Issues of change of ownership are also not covered, and it seems that the initial State of registry will always retain jurisdiction

15 See <http://www.oosa.unvienna.org/oosa/en/SORRegister/index.html>.

and control, even if the satellite is sold to a private entity in another State, making the exercise of jurisdiction and control quite difficult.¹⁶

Of course, none of these problems are specific to small satellites, but they do have an impact also in that field. To remedy some of these problems, UN resolution 62/101 was adopted in 2007.

2.4 Resolution 62/101

UN resolution 62/101 of 17 December 2007 is titled 'Recommendations on enhancing the practice of States and international intergovernmental organisations in registering space objects'.¹⁷ It contains six paragraphs, five of which are recommendations to States, and one is a three-fold request to UNOOSA. To start with the latter, the Office is requested to make available a model registration form to assist States and organisations in their submission of registration information, to publish contact details of any national focal points on its website, and to establish web links to the registries available on the internet. As regards the recommendations to States, they encompass the following:

The first recommendation addresses adherence to the Convention. States are encouraged to ratify the Registration Convention, and as long as that is not the case, to use resolution 1721B (XVI) to register their space objects. It also encourages international organisations to make declarations of acceptance in accordance with Article VII of the Convention.

The second recommendation addresses harmonisation and recommends that uniformity be strived for in the type of information provided to the UN. Specific examples include the use of COSPAR designators, of coordinated universal time, and of kilometres, minutes and degrees. Also, more information than what is prescribed by the Convention is welcomed, such as geostationary orbit location, if applicable, change of status in operations when the object is no longer functional, approximate date of decay or re-entry, date and physical conditions of moving the object to a disposal orbit, and web links to official information on space objects. Also, States and international organisations are requested to provide the contact details of the focal points for their appropriate registries, if any.

16 See on these problems, Setsuko Aoki, 'In Search of the Current Legal Status of the Registration of Space Objects' in *2010 Proceedings of the International Institute of Space Law* (Eleven 2011) 245-55; Kay-Uwe Hörl and Julian Hermida, 'Change of Ownership, Change of Registry? Which Objects to Register, What Data to be Furnished, When, and Until When?' in *Proceedings of the 46th Colloquium on the Law of Outer Space* (AIAA 2004) 454-63; Bernhard Schmidt-Tedd and Michael Gerhard, 'How to Adapt the Present Regime for Registration of Space Objects to New Developments in Space Applications?' in *Proceedings of the 48th Colloquium on the Law of Outer Space* (AIAA 2006) 353-63.

17 See on the process leading to this resolution, Marietta Benkö and Kai-Uwe Schrogl, 'The 1998 European Initiative in the UNCOPUOS Legal Subcommittee to Improve the Registration Convention' in *Proceedings of the 41st Colloquium on the Law of Outer Space* (AIAA 1999) 58-64.

The third recommendation is aimed at achieving the most complete registration. It encourages finding a solution for cases where an international organisation has not yet made a declaration of acceptance or where there is no consensus on registration among the members of that organisation. The State from whose territory or facility a space object was launched should, in the absence of prior agreement, contact States or international organisations that could qualify as 'launching States', to jointly determine who should register the object. In case of joint launches, each space object should be registered separately and included in the appropriate registry of the State responsible for the operation of the object under Article VI of the Outer Space Treaty. Lastly, States should encourage launch service providers under their jurisdiction to advise the owner and/or operator of the space object to address the appropriate States on the registration of that space object. It is especially this last part of the third recommendation that has an impact on operators of small satellites; they are increasingly faced with launch service providers claiming proof that the satellite will be registered before agreeing to launch it. This will be illustrated later on.

The fourth recommendation focuses on a change in supervision of an object while in orbit, e.g. by its sale to an operator in another State. In that case, the State of registry, in cooperation with the appropriate State according to Article VI of the Outer Space Treaty, could furnish additional information to the UN such as: date of change in supervision, identification of the new owner or operator, or any change of orbital position or function of the object. If there is no State of registry, the appropriate State according to article VI of the Outer Space Treaty could furnish that information.

The last recommendation is an open request to States and international organisations, to report to the UN any new developments in their registration practice.

2.5 Resolution 68/74

The full title of UN resolution 68/74, adopted on 11 December 2013, is 'Recommendations on national legislation relevant to the peaceful exploration and use of outer space'. It is a very useful addition to the body of UN legal instruments on outer space, and the result of a successful multi-year workplan conducted by the Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space led by Professor Irmgard Marboe.¹⁸

The resolution contains eight recommendations to States considering the adoption of national space legislation.¹⁹ The sixth is the most important in the current context as it concerns registration and reads as follows:

18 United Nations Committee on the Peaceful Uses of Outer Space, 'Report of the Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space on the work conducted under its multi-year workplan' (A/AC.105/C.2/101, 2012).

19 See the discussion of contents and relevance of this resolution in the chapter by Said Mosteshar and Irmgard Marboe in this book.

‘A national registry of objects launched into outer space should be maintained by an appropriate national authority; operators or owners of space objects for which the State is considered to be the launching State or the State responsible for national activities in outer space under the United Nations treaties on outer space should be requested to submit information to the authority to enable the State on whose registry such objects are carried to submit the relevant information to the Secretary-General of the United Nations in accordance with applicable international instruments, including the Convention on Registration of Objects Launched into Outer Space, and in consideration of General Assembly resolutions 1721B (XVI) of 20 December 1961 and 62/101 of 17 December 2007; the State may also request information on any change in the main characteristics of space objects, in particular when they have become non-functional.’

The relevance of this document for the registration of small satellites is perhaps not different than its relevance in general for all space objects, but what can be said is that the express provisions in this resolution reinforce the importance attached to registration of all space objects, including small satellites.

3 IMPLEMENTATION OF THE OBLIGATION TO REGISTER

After this overview of instruments addressing registration, some of which are legally binding treaties while others are non-legally binding resolutions, this section looks at how this set of rules and regulations is implemented in practice.

3.1 Model Registration Form

As required by UN resolution 62/101, a model registration form in six languages has been made available on the website of UNOOSA.²⁰ It consists of four parts and reflects information usually provided by States, as well additional information as recommended in resolution 62/101. The four parts are:

- Part A for information provided in conformity with the Registration Convention or resolution 1721B (XVI);
- Part B for additional information relating to a change of status in operations, as recommended in resolution 62/101;
- Part C for information relating to the change of supervision of a space object, as recommended in resolution 62/101; and
- Part D for additional voluntary information.

20 The registration form is available in MS Word and PDF format. See <http://www.oosa.unvienna.org/oosa/SORegister/resources.html>.

The questions in Part A, i.e. regarding information provided in conformity with resolution 1721B (XVI) and the Registration Convention, are the most extensive. The first question asks whether a new registration or additional information for a previously registered object is submitted. The next question concerns the launching State(s)/organisation. It asks to identify both the State of registry and other launching States. The question about the designator asks for both the COSPAR designator and the national designator or number. Then, the date and territory of the launch should be filled in, followed by the basic orbital parameters as listed in the Registration Convention. Finally, there is a question about change of status, requesting to specify the date of decay, re-entry or deorbit.

In Part B, additional information is requested based on resolution 62/101. Regarding change of *status*, it asks for (1) the date when the object is no longer functional, (2) the date when the object is moved to a disposal orbit and (3) the physical conditions when the object is moved to a disposal orbit, referring to the UN debris mitigation guidelines. Regarding the basic orbital parameters, the planned or actual geostationary position, if applicable, can be filled in. Finally, a website can be entered as additional information.

Part C also concerns resolution 62/101, but focuses on change of *supervision*. It asks for the date of the change and the identity of the new owner or operator. In case of a change in orbital positions, it asks for the old and new positions, and lastly a change in function can be indicated.

Finally, Part D for additional voluntary information asks for the owner or operator of the object, the launch vehicle, the celestial body the object is orbiting, if other than Earth, and any other information the State of registry may wish to provide.

An Annex to the form contains Section A with instructions, and Section B with definitions. The latter is split according to the four parts of the form.

Registration information can only be submitted by the government of a State of registry through the accredited Permanent Mission to the UN or by the headquarters of an international organisation that has declared acceptance of the rights and obligations under the Registration Convention.

3.2 Online Index of Objects Launched into Outer Space

As explained in sections 2.2.1 and 2.2.3, States and international organisations may submit information to the UN on the basis of the Registration Convention or of General Assembly resolution 1721B (XVI).²¹ States may also furnish information on the basis of other provisions, such as Article V or XI of the Outer Space Treaty, as seen in section 2.2.2.²²

21 The former submissions carry the code ST/SG/SER.E (cf. section 2.2.3), while the latter are referenced as A/AC.105/INF (cf. section 2.2.1).

22 These carry the code A/AC.105.

At the time of writing, there are almost fifty States and two international organisations that have provided information regarding objects launched into outer space in accordance with the Registration Convention and/or General Assembly resolution 1721B (XVI).²³ The 'Online Index of Objects Launched into Outer Space' on the website of UNOOSA currently contains 7045 objects, of which about 6500 are registered: some 2200 under A/AC.105/INF (i.e. resolution 1721B (XVI)), and 4300 under ST/SG/SER.E (Registration Convention).²⁴ Thus, approximately 500 objects are not registered.

The Index contains information on satellites launched from 1957 to the present.²⁵ It uses names and international designators that are in the public domain. Names and international designators not registered with the UN are written in square brackets ([]) and highlighted in green.

There is also a *search* function on the website. Basic search fields include:

- The designation of the space object (either the international designator or the name),
- The State or organisation,
- The date of launch,
- The place of the launch (with not only various launch sites in Algeria, Australia, China, French Guiana, India, Iran, Israel, Japan, Kazakhstan, Kenya, North Korea, Russia, the USA and the Reagan test site on the Kwajalein Atoll, but also air-based, sea-based, or submarine-based launches), and
- The launch vehicle (with a long list of about one hundred different launchers, including for instance ten different Ariane launchers).

In addition, for geostationary satellites one can indicate whether the object is in GSO and whether there is a GSO Satellite Functional Status. One can also search on the presence or absence of a nuclear power source. Furthermore, there is a field called 'UN registration', where one can specify whether or not the object is registered, whether it is registered in the A/AC.105/INF on in the ST/SG/SER.E/ series, or unknown. It is also possible to search according to whether the object is presently in space and where it is located (with a list of almost twenty options, such as 'decayed', 'on an

23 They are: Algeria, Argentina, Australia, Austria, Belarus, Belgium, Bolivia, Brazil, Canada, Chile, China, Czech Republic, Democratic People's Republic of Korea, Denmark, Egypt, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Malaysia, Mexico, the Netherlands, Nigeria, Norway, Pakistan, Philippines, Poland, Republic of Korea, Russian Federation, Saudi Arabia, South Africa, Spain, Sweden, Thailand, Turkey, Ukraine, United Arab Emirates, UK, USA, Venezuela as well as ESA and EUMETSAT. See <http://www.unoosa.org/oosa/en/SORegister/docsstatidx.html>. Note that this page also lists Indonesia and Azerbaijan: <http://www.unoosa.org/oosa/en/SORegister/index.html>.

24 See <http://www.oosa.unvienna.org/oosa/en/osoindex.html>.

25 However see also <http://www.oosa.unvienna.org/oosa/en/SORegister/index.html> where the year 1962 is mentioned.

asteroid', 'heliocentric', 'on Venus' and so on). Searches are also possible on the theme 'manned space flight', where a selection of spacecraft types can be ticked (e.g. 'Apollo', 'Soyuz', etc.) as well as a selection of space station types ('ISS' or 'Mir' components, 'Skylab'...). Lastly, it is possible to search for specific GPS/navigation constellations such as GPS or GLONASS, and for search and rescue constellations (COSPAS-SARSAT).

The above shows that the search possibilities for objects registered with the UN are seemingly endless; any combination of search fields can be filled. It seems fair to conclude that since there is no search field according to the size or mass of the object, the question whether an object is small or large does not make any difference.

3.3 Index of Notifications on the Establishment of National Registries

States are obliged to set up a national registry and to inform the UN of their establishment pursuant to Article II of the Registration Convention. Resolution 62/101 requests UNOOSA to establish links on its website to such registries. This is done by means of an online 'Index of Notifications by Member States and Organisations on the Establishment of National Registries of Objects Launched into Outer Space'.²⁶ All 29 entries carry an ST/SG/SER.E.INF code, numbered ST/SG/SER.E.INF/1-29, meaning they are all based on the Registration Convention.

One example is this *Note verbale* dated 21 January 2014 from the Permanent Mission of Norway to the UN in Vienna, addressed to the Secretary-General:

'The Permanent Mission of Norway to the United Nations (Vienna), in accordance with article II of the Convention on Registration of Objects Launched into Outer Space (General Assembly resolution 3235 (XXIX), annex), has the honour to notify the Secretary-General of the United Nations that Norway has established a registry of objects launched into Earth orbit or beyond, which will be maintained by the Norwegian Space Centre in Oslo.'²⁷

The Netherlands is quite unique in this context, as it has set up a national register with two sub-registries. First a UN part, to register objects for which the Netherlands is the State of registry in accordance with Article II of the Registration Convention, and secondly a national part, to register objects for which the Netherlands is responsible in accordance with Article VI of the Outer Space Treaty and has jurisdiction and control under Article VIII,

26 See <http://www.unoosa.org/oosa/en/spaceobjectregister/national-registries/index.html>.

27 See http://www.unoosa.org/pdf/reports/regdocs/SERE_INF_029E.pdf.

but does not consider itself as the launching State.²⁸ This will be elaborated below.

4 SMALL SATELLITES AND THE NETHERLANDS

Having reviewed international mechanisms relating to registration and some ways and means of their practical implementation, it is interesting to see what has been done at the national level with regard to the registration of satellites, including small satellites. The case of the Netherlands will be used as an example.²⁹

4.1 The Situation in General

Most small satellites are registered, but not always by the State concerned. A few examples are given to illustrate this. Austria registered TUGSAT-1 and UniBRITE in May 2013, just three months after the launch, providing extensive information to the UN.³⁰ Likewise, in June 2014 Belgium registered and provided information about three precursor satellites of the QB50 project,³¹ stating: 'Through its support for the QB50 Precursor Flight mission and more generally for the entire project of which that mission is a part, Belgium attained the status of launching State.'³²

In May 2014, Russia notified that it had launched 23 small satellites on an intercontinental ballistic missile Dnepr on behalf of foreign clients in November 2013. This included satellites for clients in several States.³³ The

28 Note verbale dated 3 June 2009 from the Permanent Mission of the Netherlands to the United Nations (Vienna) addressed to the Secretary-General (ST/SG/SER.E/INF.24) <https://cms.unov.org/LLSULinkbase/ContentTree.aspx?nodeID=2324>. The national part of the Dutch registry is available here, it contains satellites operated by the only licensed operator under the Dutch act so far, New Skies Satellites BV: <http://www.agentschap-telecom.nl/sites/default/files/ruimtevoorwerpen-database-nationaal-deel.pdf>. The UN part of the register is available here but is still empty: <http://www.agentschaptelecom.nl/sites/default/files/ruimtevoorwerpen-database-vn-deel.pdf>.

29 See for an interesting comparison between the laws of three small states (Austria, Belgium and the Netherlands) in respect of regulating small satellites, Irmgard Marboe and Karin Traunmüller, 'Small Satellites and Small States: New Incentives for National Space legislation' (2012) 38 *Journal of Space Law* 289.

30 Note verbale dated 13 May 2013 from the Permanent Mission of Austria to the United Nations (Vienna) addressed to the Secretary-General (ST/SG/SER.E/676) <http://www.unoosa.org/oosa/en/osoindex/data/documents/at/st/stsgser.e676.html>. See on the Austrian space legislation, Irmgard Marboe, 'Austrian Federal Law on the Authorisation of Space Activities and the Establishment of a National Registry (Austrian Outer Space Act)' in *2011 Proceedings of the IISL* (Eleven 2012) 530-37.

31 QB50 is an EU-funded project. See <https://www.qb50.eu>.

32 Note verbale dated 30 June 2014 from the Permanent Mission of Belgium to the United Nations (Vienna) addressed to the Secretary-General (ST/SG/SER.E/721) <http://www.unoosa.org/oosa/en/osoindex/data/documents/be/st/stsgser.e721.html>.

33 Note verbale dated 8 April 2014 from the Permanent Mission of the Russian Federation to the United Nations (Vienna) addressed to the Secretary-General (ST/SG/SER.E/709) <http://www.unoosa.org/oosa/en/osoindex/data/documents/ru/st/stsgser.e709.html>.

names of the satellites and their basic function ('technological applications', 'remote sensing', 'astronomy'...) are listed in the document; no further details are given. A check in the UN Online Index based on the names of all these satellites shows that only five States, i.e. Germany, Republic of Korea, Norway, Poland and the UAE, registered the satellites with the UN. The eleven remaining States, i.e., Argentina, Denmark, Ecuador, Italy, Japan, the Netherlands, Singapore, South Africa, Spain, Ukraine and the USA, did not. Therefore, these satellites are listed in green and between brackets, and the remarks say: 'Mentioned by the Russian Federation in ST/SG/SER.E/709'.

This shows that even though the State of the launch provider tends to submit basic information to the UN, the detailed information that is needed is in most cases not available because the States concerned do not register the satellites themselves.

4.2 The Situation in the Netherlands

For the Netherlands, the UN Online Index lists only two objects, both entered 'for the Netherlands', so both not registered with the UN by the Netherlands. The first concerns a very old satellite, ANS-1, whose decay in 1977 was notified to the UN (a link leads to a NASA webpage). The second concerns Delfi-N3XT, launched in November 2013 and reported by Russia in April 2014, as mentioned above.³⁴

The reason for this limited number is twofold. Firstly, the Netherlands has currently only satellites in the *national* part of its registry and none in the UN part, and it does not provide information about objects in the national part of the registry to the UN. A second reason lies in the restrictive interpretation of the scope of the Dutch law, which has the result that small satellites launched by Dutch companies cannot be registered in either part of the Dutch registry, i.e., neither the national part nor the UN part. To explain this, the next section will provide some background about the Dutch national space legislation.

4.2.1 *The Netherlands National Space Legislation and Registration of Small Satellites*

The Netherlands Space Activities Act, henceforth, in this section, 'the Act' or 'the Dutch Act', in force since 1 January 2008, establishes a flexible licensing system for private space operators, including all necessary requirements such as insurance and regulation of liability issues.³⁵ The Act contains a

34 The other two satellites launched for the Dutch client are actually listed under the UK (i.e., FUNcube and Triton 1); both are not registered with the UN by the UK.

35 Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, 24 January 2007, 80 *Staatsblad* (2007), Space Activities Act. An English translation is available at <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/state-index.html>.

series of conditions to be complied with by operators, relating to the safety of persons and property, environmental protection, public order and security, and financial security, as well as compliance with international obligations of the State.

As usual in many national space laws, sufficient insurance coverage is a key requirement for granting a license. The amount of the required insurance is what the Minister considers to be the maximum possible cover for the liability arising from the space activities for which a licence is requested, taking into account what can reasonably be covered by insurance. The liability of the license holder is limited to the sum insured. The Act does not apply to activities of Dutch citizens abroad.

The Dutch Act also creates a Registry for space objects. It stipulates that the Dutch State has the right to recover from private operators any compensation paid by the State for damages caused to third parties.

Registration must be carried out by a launching State, but the Netherlands does not consider itself as launching State for satellites launched abroad for Dutch private entities.³⁶ Instead, its understanding of the term 'to procure a launch' is that this only applies when the government itself procures a launch for a governmental satellite. The small private satellites are not launched by the Netherlands or from Dutch territory or a Dutch facility. This means that all possibilities to designate the Netherlands as a launching State as defined in Article I of the Registration Convention, which has the same wording as the definition provided in Article I of the Liability Convention, are exhausted. The Netherlands, according to this interpretation, is not a launching State and will therefore not register these satellites in accordance with the Convention, so they will not be entered into the 'UN part' of the national registry.

The second sub-register is for objects for which the Netherlands does not consider itself a launching State but does consider itself as the State responsible under Article VI of the Outer Space Treaty, to carry out authorisation and supervision over Dutch space activities and objects. The Netherlands can provide information to the UN about objects entered into this sub-register in accordance with Article XI of the Outer Space Treaty, which does not mention the launching State but refers to States 'conducting activities in outer space'. It provides that States should inform the UN, the public and the international scientific community about their space activities to promote international cooperation, and that the UN should disseminate such information. The use of this legal provision to provide information to the UN about space objects, without formal registration as a launching State

36 For a good overview of the Netherlands position, see Olivier Ribbelink, 'The registration policy of the Netherlands' in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Current issues in the registration of space objects* (Institute of Air and Space Law of the University of Cologne/German Aerospace Center 2005) 53.

is not unique; in the past it was used by the United Kingdom to register satellites on behalf of Inmarsat IGO.³⁷

An interesting question for the Netherlands is whether small satellites fall within the scope of the national space legislation. The Dutch Act applies to the 'launch' of objects from the Netherlands or from a Dutch ship or plane, which is not likely to occur in the near future, and to 'flight operation' and 'guidance of space objects in outer space'.³⁸ This implies that space objects that are launched from abroad and are neither operated or guided from the Netherlands, do not fall under the law, and hence do not require a license. Indeed, so far, small satellites are generally not 'manoeuvrable'. A narrow interpretation of the Dutch Space Activities Act, which defines space activities restrictively as covering only a 'launch' from the Netherlands or a Dutch ship or plane, 'flight operation' and 'guidance of space objects in outer space', would not cover small satellites that are not manoeuvrable. As a consequence, small satellites would not be registered under the Dutch Act. This could be considered as a too restrictive interpretation of the UN space treaties, which do not restrain themselves according to whether objects are manoeuvrable or not, or whether they are large or small.

As this narrow interpretation was upheld by the Dutch authorities in the first years, small non-manoevrable satellites of Dutch private entities were not registered nationally or with the UN. They were not entered in the UN part of the national register because the Netherlands did not consider itself the launching State of satellites launched by a private entity – whether they were small or large. They could not be entered into the national part of the register either, because they were not 'launched', 'guided' or 'operated' from the Netherlands.

This situation was expected to change for two reasons. On the one hand, the technological capabilities of small satellites are developing at a very fast pace, and very soon they will be manoeuvrable and thus will be 'guided' and/or 'operated' from the Netherlands. That means they will fall under

37 See Note verbale dated 9 September 2002 from the Permanent Mission of the United Kingdom of Great Britain and Northern Ireland to the United Nations (Vienna) addressed to the Secretary-General (ST/SG/SER.E/417/Rev.1) <https://cms.unov.org/LLSULinkbase/ContentTree.aspx?nodeID=3034>.

38 The latter two terms are defined as follows in the Explanatory Note: The term '*flight operation*' is understood to mean the navigation, tracking and control of a space object during the flight phase, i.e. the phase between the launch of the space object and the time at which it takes up a position in outer space. Such activities can be performed from facilities, bases, earth stations or other control centres established on Dutch territory. This likewise applies with regard to the *guidance* of space objects in outer space (outer-space activities in the broad sense). This includes all command and control activities in relation to a space object (usually a satellite) – e.g. the execution of major and minor manoeuvres designed to keep a satellite in its position in outer space or to adjust its position/orbit, checking that there is no space debris in the vicinity that might cause problems, and monitoring the fuel level of geostationary satellites, etc., so as to ensure that satellites can be decommissioned when they are no longer in use (by placing them into a 'decommissioning orbit' around 200 km higher than the geostationary orbit).

the definition of space activities and the Netherlands will require them to be licensed to comply with its obligations under Article VI of the Outer Space Treaty, and will register them in the national part of the registry. Registration in the UN part of the national registry is not expected however, so the UN will not be informed pursuant to Article XI of the Outer Space Treaty.

On the other hand, the Dutch government felt the need to pass an administrative measure, clarifying that satellites that are 'unguided' should also fall under the scope of the law and need to apply for a license. Such an administrative measure was signed by the King on 19 January 2015 and entered into force on 1 July 2015.³⁹ It made the Dutch Space Act explicitly applicable also to unguided satellite missions. By a broader definition of the concepts of 'operation' and 'guidance', non-manoeuverable small satellites will henceforth fall under the scope of application of the Dutch Space Act.

4.2.2 A Complicating Factor: The Practice of Launch Service Providers

As an interesting effect of resolution 62/101, launch service providers increasingly require their clients, including those wishing to launch small satellites, to submit proof of registration as a condition for launch.

This can be traced back to a specific provision in the resolution, which provides that 'States should encourage launch service providers under their jurisdiction to advise the owner and/or operator of the space object to address the appropriate States on the registration of that space object'.⁴⁰ This means that operators of small satellites will ask their government for a declaration that it will register the satellite.

In the case of the Netherlands this also happened, as the launch provider asked the client for such a declaration. This placed the Dutch government in front of a dilemma: on the one hand it could not register the small satellite because it did not fall within the scope of the Dutch Space Act, because there was no launch, guidance or operation, while on the other hand it had a policy to encourage innovation and not to hamper the business of the Dutch company.

This situation was the catalyst for the initiation of the administrative measure of 2015 to apply the Dutch Space Act to small non-manoeuverable satellites so that registration at least in the national part of the registry becomes possible. The Netherlands can now also duly carry out its duty to authorise and supervise by imposing a license obligation. Before that, an *ad hoc* solution was found: the government provided a letter and imposed an insurance obligation, so that the company could proceed with the launch of its satellites while at the same the government could protect its interests.

39 See the 'Besluit ongeleide satellieten' in the Dutch Staatsblad of 28 January 2015, <https://zoek.officielebekendmakingen.nl/stb-2015-18.html>. The term used is 'unguided' satellites, to remain within the terminology of the law; the term 'small' is not used even though that seems to have become the term of art internationally.

40 See above, at section 2.2.4.

It remains to be seen whether launch providers will consider the registration in the national part of the registry, i.e. without notification to the UN, as satisfactory. The downside of this solution is that the satellite will still not be registered internationally, unless another State does, such as the State from whose territory or facility the launch took place.

The Netherlands is not trying to escape its obligations under the treaties, but believes that bilateral agreements should be concluded between States concerned in order to determine which of them should be considered the launching State for which part of a launch operation. This is in accordance with Article V of the 1972 Liability Convention, which provides that 'participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable'. States were encouraged to make use of this possibility in resolution 59/115 of 10 December 2004 on 'Application of the concept of the 'launching State''.⁴¹ Such an agreement could also settle which State should register the satellite. Discussions are currently underway for the first such agreement. Then there would be registration by the Netherlands in the national part of the register, and registration at the UN by another State; one that qualifies as a launching State.

5 CONCLUSIONS

The general legal framework for space activities under public international law as contained in the UN treaties is sufficiently general and flexible to enable and encourage States to carry out space activities in an orderly manner. National legal regimes specify and implement treaty obligations, enabling the private sector to operate in a clear legal framework. The emergence of small satellites poses new challenges to the regulation of space activities, both in terms of understanding and accommodating their characteristics and those of their operators. They are a promising new tool to explore and use space, and will need legal certainty. In principle, whether a satellite is small or large does not matter under current space law. However, some differences can be observed, including a different treatment in terms of licensing as well as registration.

The actors that own and operate small satellites, which bring so many promises of democratising space, are unconventional. They often do not know about space law requirements and issues such as registration, liability, licenses, insurance, etc. Therefore it is essential to build capacity and create awareness. There is a need to inform them, for instance by means of workshops, information notices, websites, and so on. As demonstrated above, the UNOOSA is doing its part in making the information as well as the requirements transparent and easily accessible via its website.

41 See paragraph 2 of the resolution.

The section in resolution 62/101 recommending that States should encourage launch service providers under their jurisdiction to advise the owner and/or operator of the space object to address the appropriate States on the registration of that space object will also help to build capacity among these new actors. For instance, this concretely led to the practice of launch service providers requiring proof of registration from client's governments.

The section in the same resolution requiring the State from whose territory or facility a space object was launched, in the absence of prior agreement, to contact States or international organisations that could qualify as 'launching States' to jointly determine which State or entity should register the space object is equally important.

Finally, the practice, in accordance with Article V of the Liability Convention, to seek bilateral agreements to settle questions of liability and attribution of the status of launching State will also help to ensure that space objects are duly registered in the future.

Although the registration of small satellites poses certain problems, the tools to remedy them are in place. Over time, with experience and practice, it will be possible to ensure compliance with the UN instruments and national legislation while benefiting to the maximum of the new wave in the space age: the revolution brought by small satellites.