



Universiteit
Leiden
The Netherlands

Regulating a revolution : small satellites and the law of outer space
Palkovitz Menashy, N.

Citation

Palkovitz Menashy, N. (2019, June 18). *Regulating a revolution : small satellites and the law of outer space*. Retrieved from <https://hdl.handle.net/1887/85164>

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/1887/85164>

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

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/85164> holds various files of this Leiden University dissertation.

Author: Palkovitz Menashy, N.

Title: Regulating a revolution : small satellites and the law of outer space

Issue Date: 2019-06-18

Bibliography:

Treaties, Conventions and International Agreements:

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, (1979) 1363 *U.N.T.S.* 3.

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, (1968) 672 *U.N.T.S.* 119.

Convention on International Civil Aviation, 1944 15 *U.N.T.S.* 295.

Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets (Berlin, 9 March 2012).

Convention on International Liability for Damage Caused by Space Objects, (1972) 961 *U.N.T.S.* 187.

Convention on Registration of Objects Launched into Outer Space, (1975) 1023 *U.N.T.S.* 15.

Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, U.N. Doc FCCC/CP/1997/7/Add.1, 37 *I.L.M.* 22 (1998).

Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women *U.N.T.S.*, vol. 2131.

Rome Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, (1952) 310 *U.N.T.S.* 181.

Statute of The International Court of Justice 3 *Bevans* 1179; 59 *Stat.* 1031; *T.S.* 993; 39 *AJIL Supp.* 215 (1945).

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

United Nations Convention on the Law of the Sea, 1982 1833 *U.N.T.S.* 3.

Legislation:

Austria:

Austrian Federal Law on the Authorisation of Space Activities and the Establishment of a National Space Registry (Austrian Outer Space Act, adopted by the National Council on 6 December 2011, entered into force on 28 December 2011).

Belgium:

Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects, consolidated text as revised by the Law of 1 December 2013 (B.O.J. of 15 January 2014).

Canada:

Canada Gazette, Part I, Volume 152, Number 24: Government Notices, Interim Order No. 9 Respecting the Use of Model Aircraft (31 May 2018).

The Netherlands:

Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, 24 January 2007.

Staatsblad van het Koninkrijk der Nederlanden 2015 18, Besluit van 19 januari 2015, houdende uitbreiding van de toepassing van de Wet ruimtevaartactiviteiten op het beheren van ongeleide satellieten (Besluit ongeleide satellieten).

Kazakhstan:

Law of the Republic of Kazakhstan on Space Activities (No.528-IV of 6 January 2012) Art. 1(3) National operators of space systems- legal entities that carry out the management of space systems and their operations.

European Union:

Regulation (EU) 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to de minimis aid.

Regulation (EU) 1408/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to de minimis aid in the agriculture sector.

Regulation (EU) 2018/1139 of the European parliament and council 4 July 2018.

Court Cases, Arbitrations and Advisory Opinions:

Barcelona Traction Light Power Company, Limited (Belgium v Spain), I.C.J. Reports (1970).

Factory at Chorzów, Jurisdiction, Judgment No. 8, 1927, P.C.I.J., Series A, No. 9.

Nottebohm (Liechtenstein v Guatemala), I.C.J. reports (1955).

Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports (1996).

Lotus Case (France v Turkey) (1927) P.C.I.J., Ser. A, No. 10.

Rainbow Warrior affair, UNRIAA, vol. XX (Sales No. E/F.93.V.3) (1990).

United Nations and ITU Documents:

Committee on the Peaceful Uses of Outer Space- Legal Subcommittee, Status of International Agreements relating to activities in outer space as at 1 January 2017, UN Doc. A/AC.105/C.2/2017/CRP.7 (2017).

Committee on the Peaceful Uses of Outer Space- Legal Subcommittee, Status of International Agreements relating to Activities in Outer Space as at 1 January 2018, UN Doc. A/AC.105/C.2/2018/CRP.3 at 10 (2018).

Declaration of the United Nations Conference on the Human Environment U.N. Doc. A/Conf.48/14/Rev. 1 (1973); 11 ILM 1416 (1972).

Information Furnished in Conformity with the Convention on Registration of Objects Launched Into Outer Space, Note verbale dated 4 March 1998 from the Permanent Mission of the Russian Federation to the United Nations (Vienna) addressed to the Secretary-General', UN Doc. ST/SG/SER.E/332 (19 March 1998).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 13 May 2013 from the Permanent Mission of Austria to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/676 (17 May 2013).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 17 December 2013 from the Permanent Mission of Poland to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/695 (13 January 2014).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 7 November 2014 from the Permanent Mission of Italy to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/734 (19 December 2014).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 23 December 2014 from the Permanent Mission of the United States of America to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/736 (15 January 2015).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 12 August 2014 from the Permanent Mission of the Russian Federation to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/728, Annex II at 4. (20 October 2015).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note verbale dated 28 June 2016 from the Permanent Mission

of Poland to the United Nations (Vienna) addressed to the Secretary-General, UN Doc. ST/SG/SER.E/773 (2 August 2016).

Information furnished in conformity with the Convention on Registration of Objects Launched into Outer Space, Note Verbale dated 24 January 2017 from the Permanent Mission of Canada to the United Nations (Vienna) addressed to the Secretary-General (22 February 2017).

International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, *Official Records of the General Assembly*, Fifty-sixth session, Supplement No. 10 (A/56/10), chp.IV.E.1 (2001).

International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts with Commentaries, *Yearbook of the International Law Commission* (2001) vol. II.

International Law Commission, Prevention of Transboundary Harm from Hazardous Activities, *Official Records of the General Assembly*, Fifty-sixth Session, Supplement No. 10 (A/56/10) (2001).

Letter Dated 16 June 1966 from the Permanent Representative of the Union of Soviet Socialist Republic to the United Nations Addressed to the Secretary-General, UN Doc. A/6325 (16 June 1966).

Letter Dated 11 July 1966 Addressed to the Chairman of the Legal Sub-committee by the Representative of the USSR, UN Doc. A/AC.105/C.2/L.13 (11 July 1966).

Note verbale dated 29 July 2003 from the Permanent Mission of the Netherlands to the United Nations (Vienna) addressed to the Secretary-General UNGA Doc. A/AC.105/806.

'Prague Declaration on Small Satellite Regulation and Communication Systems' ITU Symposium and Workshop on small satellite regulation and communication systems, Prague, Czech Republic, 2-4 March 2015.

Report of the Legal Subcommittee on its forty-sixth session, held in Vienna from 26 March to 5 April 2007, UN Doc. A/AC.105/891, Report of the Chairman of the Working Group on the Practice of States and International Organizations in Registering Space Objects, (2 May 2007).

Report ITU-R SA.2312-0, *'Characteristics, definitions and spectrum requirements of nanosatellites and picosatellites, as well as systems composed of such satellites'*, SA Series Space applications and meteorology (September, 2014).

Report ITU-R SA.2348-0, '*Current practice and procedures for notifying space networks currently applicable to nanosatellites and picosatellites*' SA Series Space applications and meteorology, (May 2015).

Resolution 659 (WRC-15), '*Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions*' (Geneva, 2015).

Resolution 757 (WRC-12) '*Regulatory Aspects for Nanosatellites and Picosatellites*' (Geneva, 2012).

Resolution ITU-R 68 (2015), '*Improving the Dissemination of Knowledge Concerning the Applicable Regulatory Procedures for Small Satellites, Including Nanosatellites and Picosatellites*'.

Responses to the questionnaire on the application of international law to small-satellite activities, UN Doc. A/AC.105/C.2/2018/CRP.10 (6 April 2018).

UNGA Res. 1348 (XIII) Question of the Peaceful Use of Outer Space (13 December 1958).

UNGA Res. 1721B (XVI) International Co-Operation in the Peaceful Uses of Outer Space (20 December 1961).

UNGA Res. 1962 (XVIII) Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (13 December 1963).

UNGA Res. 37/92 Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting (10 December 1982).

UNGA Res. 41/65 Principles relating to Remote Sensing of the Earth from Space (3 December 1986).

UNGA Res. 47/68 Principles Relevant to the Use of Nuclear Power Sources in Outer Space (14 December 1992).

UNGA Res. 51/122 Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of all States, Taking into Particular Account the Needs of Developing Countries (13 December 1996).

UNGA Res. 59/115 Application of the Concept of 'Launching State' (25 January 2005).

UNGA Res. 62/101 Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering space Objects (17 December 2007).

UNGA Res. 68/74 Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space (11 December 2013).

Union of Soviet Socialist Republics: Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space, UN Doc A/AC.105/C.2/L.1 (06 June 1962).

UNISPACE III, *Small Satellite Missions*, Background paper 9, 5 A/CONF.184/BP/9 (26 May 1998).

United Nations Committee on the Peaceful Uses of Outer Space (Legal Sub Committee, 44th Session, April 2005), 'Registration Statistics for 1957- 2004'; Note by the Secretariat UN Doc.A/AC.105/C.2/2005/CRP.10 (14 April 2005).

United Nations, Office for Outer Space Affairs and the International Telecommunication Union, 'Guidance on Space Object Registration and Frequency Management for Small and Very Small Satellites' (2015).

United Nations, Office for Outer Space Affairs, 'Draft Questionnaire on the Application of International Law to Small Satellite Activities' UN Doc. A/AC.105/C.2/2017/CRP.11 (27 March 2017).

United Nations, Office for Outer Space Affairs, 'Guidelines for the Long-term Sustainability of Outer Space Activities- Conference room paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities' UN Doc. A/AC.105/2018/CRP.20 (27 June 2018).

United Nations, Office for Outer Space Affairs, Legal Subcommittee: 2014, IISL/ECSL Symposium on 'Regulatory Needs for Very Small Satellites', 24 March 2014.

United Nations, Office for Outer Space Affairs, Schematic Overview of National Regulatory Frameworks for Space Activities, UN Doc. A/AC.105/C.2/2012/CRP.8 (16 March 2012).

Books and Articles:

R Acevedo and R Beccera, 'Small Satellites as a Chance for Developing Countries' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

D Baiocchi and W Welser, 'The Democratization of Space' (2015) 94 *Foreign Affairs*.

W Balogh, 'Capacity Building in Space Technology Development: The Role of the United Nations' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

W Balogh 'The Role of Binding and Non-binding Norms in the Implementation of Small Satellites Programmes' in I Marboe (ed), *Soft Law in Outer Space: The function of Non-binding Norms in International Space Law* (Brill Nijhoff 2012).

R Bender, *Space Transport Liability: National and International Aspects* (Kluwer 1995).

M Benko and E Plescher, *Space Law- Reconsidering the Definition/Delimitation Question and the Passage of Spacecraft through Foreign Airspace* (Eleven International Publishing 2013).

PJ Blount, 'Renovating Space: The Future of International Space Law' (2012) 40/1 Denver Journal of International Law and Policy.

KH Bockstiegel, 'The Term 'Appropriate State' in International Space Law', Proceedings of the Thirty-Seventh Colloquium on the Law of Outer Space (1995).

KH Bockstiegel, The Term 'Launching State' in International Space Law, IISL Proceedings of the Thirty-Seventh Colloquium on the Law of Outer Space (1995).

I Brownlie, *System of the Law of Nations: State Responsibility* (Part 1; OUP 1983).

B Cheng, 'A Reply to Charges of Having Inter Alia Misused the Term Absolute Liability in Relation to the 1966 Montreal Inter-Carrier Agreement in My Pleas for an Integrated System of Aviation Liability' (1981) 6 Annals of Air and Space Law.

B Cheng, 'Article VI of the Outer Space Treaty Revisited: "International Responsibility", "National Activities", and "The Appropriate State"' (1998) 26(1) Journal of Space Law.

B Cheng, *Studies in International Space Law* (Clarendon Press 1997).

B Cheng, 'The legal Regime of Airspace and Outer Space; The Boundary Problem, Functionalism versus Spatialism: The Major Premises' (1980) 5 Annals of Air and Space Law.

B Cheng, 'United Nations Resolutions on Outer Space: "Instant" International Customary Law?' (1965) 5 Indian Journal of International Law.

IHPH Diederiks-Verschoor, *An Introduction to Air Law* (8th rev edn; Kluwer Law International 2006).

F von der Dunk, 'Liability for Damage Caused by Small Satellites- A Non-issue?' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

F von der Dunk, *Liability versus Responsibility in Space Law: Misconception or Misconstruction?*, Proceedings of the Thirty-Fourth Colloquium on the Law of Outer Space (1992).

F von der Dunk, 'Regulation of Space Activities in the Netherlands: From Hugo Grotius to the High Ground of Outer Space' in RS Jakhu (ed), *National Regulation of Space Activities* (Springer 2010).

F von der Dunk, 'The Origins of Authorization: Article VI of the Outer Space Treaty' in F von der Dunk (ed), *National Space Legislation in Europe* (Brill Nijhoff 2011).

F von der Dunk (ed), *National Space Legislation in Europe* (Brill Nijhoff 2011).

F von der Dunk, 'Too-Close Encounters of the Third Party Kind: Will the Liability Convention Stand the Test of the Cosmos 2251-Iridium 33 Collision?' IISL Proceedings of the 52nd Colloquium on the Law of Outer Space (2009).

S Engelen et al, *The Road to OLFAR - A Roadmap to Interferometric Long-Wavelength Radio Astronomy Using Miniaturized Distributed Space Systems*, Proceedings of the 64th International Astronautical Congress (2013).

HP van Fenema, 'Legal Aspects of Launch Services and Space Transportation' in F von der Dunk and F Tronchetti (eds), *Handbook of Space Law* (Elgar 2015).

S Freeland, *The Impact of Space Tourism on the International Law*, IISL Proceedings of the 48th Colloquium on the Law of Outer Space (2006) 187.

C Gaubert 'Do Small Satellites Need Insurance?' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

M Gerhard, 'Transfer of Operation and Control with Respect to Space Objects- Problem of Responsibility and Liability of States' (2002) 51 *Zeitschrift für Luft- und Weltraumrecht*.

PPC Haanappel, 'Enforcing the Liability Convention: Ensuring the Binding Force of the Award of the Claims Commission' in M Benko and K-U Schrogl (eds), *Space Law: Current Problems and Perspectives for Future Regulation* (eleven international publishing 2005).

MP Hershey et al, *Paving the Way for Small Satellite Access to Orbit: Cyclops' Deployment of SpinSat, the Largest Satellite ever Deployed from the International Space Station*, Proceedings of the 29th Annual AIAA/USU Conference on Small Satellites (2015).

MP Hershey et al, *Solidifying Small Satellite Access to Orbit via the International Space Station (ISS): Cyclops' Deployment of the Lonestar SmallSat from the ISS*, Proceedings of the 30th Annual AIAA/USU Conference on Small Satellites (2016).

S Hobe and J Cloppenburg, *Towards a New Aerospace Convention?- Selected Legal Issues of 'Space Tourism'* IISL Proceedings of the 47th Colloquium on the Law of Outer Space (2005).

S Hobe, B Schmit-Tedd and K Schrogl (eds), *Cologne Commentary on Space Law* (vol. I Outer Space Treaty; Carl Heymanns Verlag 2009).

S Hobe, B Schmidt-Tedd and K-U Schrogl (eds), *Cologne Commentary on Space Law vol. II Rescue Agreement, Liability Convention, Registration Convention, Moon Agreement* (Carl Heymanns Verlag 2013).

S Hobe, B Schmidt-Tedd and K-U Schrogl (eds.), *Cologne Commentary on Space Law vol. III* (Carl Heymanns Verlag 2015).

BA Hurwitz, *State Liability for Outer Space Activities in Accordance with the 1972 Convention on International Liability for Damage Caused by Space Objects* (1992).

RS Jakhu, 'Iridium-Cosmos Collision and its Implications for Space Operations' in K-U Schrogl (ed), *Yearbook on Space Policy: 2008/2009* (Springer 2010).

RS Jakhu and JN Pelton, *Small Satellites and Their Regulation* (Springer 2014).

RS Jakhu et al, 'Critical Issues Related to Registration of Space Objects and Transparency of Space Activities' (2018) *Acta Astronautica*.

N Jasentuliyana, 'Article I of the Outer Space Treaty Revisited' (1989) 17/2 *Journal of Space Law*.

CW Jenks, *Space Law* (Stevens and Sons 1965).

K Karvinen et al, *Using Hobby Prototyping Boards and Commercial-off-the-shelf (COTS) Components for Developing Low-cost, Fast-delivery Satellite Subsystems*, (2015) 4(1) *Journal of Small Satellites*.

V Kayser, *Launching Space Objects: Issues of Liability and Future Prospects* (Springer 2001).

A Kerrest, 'Remarks on the Notion of Launching State', *Proceedings of the 42nd Colloquium on the Law of Outer Space* (1999).

O Koudelka, 'Micro/Nano/Picosatellite-Activities: Challenges towards Space Education and Utilisation' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

I Marboe, 'The Importance of Guidelines and Codes of Conduct for Liability of States and Private Actors' in I Marboe (ed), *Soft Law in Outer Space: The function of Non-binding Norms in International Space Law* (Brill Nijhoff 2012).

I Marboe, 'Small is Beautiful? Legal Challenges of Small Satellites' in PM Sterns and LI Tennen (eds), *Public Law, Private Law, Metalaw and Public Policy in Space* (Springer 2016).

T Masson-Zwaan, 'Article VI of the Outer Space Treaty and Private Human Access to Space', *Proceedings of the International Institute of Space Law* (2008); AIAA, (2009).

T Masson-Zwaan, 'Liability and Insurance for Suborbital Flights', *Proceedings of the 5th IAASS Conference 'A Safer Space for a Safer World'*, Versailles, France 17–19 October 2011 (ESA SP-699, January 2012).

T Masson-Zwaan, 'Space Law and the Satellite Collision of 10 February 2009' in *Space Research Today*, COSPAR's Information Bulletin no. 174 (2009).

T Masson-Zwaan, 'Registration of Small Satellites and the Case of the Netherlands' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

A Matas et al, 'The ITU Radio Regulations Related to Small Satellites' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

JF Mayence, 'QB50: Legal Aspects of a Multinational Small Satellites Initiative' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

M Mejia-Kaiser, 'Collision Course: 2009 Iridium-Cosmos Crash' IISL Proceedings of the 52nd Colloquium on the Law of Outer Space (2009).

MC Mineiro, 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations Under Article IX of the Outer Space Treaty' (2008) 34/2 Journal of Space Law.

P Montpert, 'Space Insurance' in LJ Smith and I Baumann (eds), *Contracting for Space: Contract Practice in the European Space Sector* (Routledge 2011).

C Niederstrasser, *Small Launch Vehicles – A 2015 State of the Industry Survey*, Proceedings of the 29th Annual AIAA/USU Conference on Small Satellites (2015).

G Lafferranderie and S Marchisio (ed), *The Astronauts and Rescue Agreement: Lessons Learned* (ECSL/ESA Publication 2011).

F Lyall and PB Larsen, *Space Law a Treatise* (2nd edn; Routledge 2018).

O de Oliveira Bittencourt Neto, *Defining the Limits of Outer Space for Regulatory Purposes* (Springer 2015).

N Palkovitz, *Dealing with the Regulatory Vacuum in LEO: New Insurance Solutions for Small Satellites Constellations*, IISL Proceedings of the 59th Colloquium on the Law of Outer Space (2017).

N Palkovitz, 'Exploring the Boundaries of Free Exploration and Use of Outer Space – Article IX and the Principle of Due Regard, Some Contemporary Considerations' IISL Proceedings of 57th Colloquium on the Law of Outer Space (2015).

N Palkovitz 'New Insurance Products for the Launch of Small Satellites' *Proceedings of the 4S Symposium* (2016).

N Palkovitz, 'Small Satellites: Innovative Activities, Traditional Laws, and the Industry Perspective' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

N Palkovitz, *Space Entrepreneurship and Space Law- Future Challenges and Potential Solutions*, IISL Proceedings of the 56th Colloquium on the Law of Outer Space (2014).

N Palkovitz and T Masson-Zwaan, *Orbiting under the Radar: Nano-Satellites, International Obligations and National Space Laws*, IISL Proceedings of the 55th Colloquium on the Law of Outer Space (2013).

N Palkovitz and T Masson-Zwaan, *Small but on the Radar: The Regulatory Evolution of Small Satellites in The Netherlands*, IISL Proceedings of the 58th Colloquium on the Law of Outer Space (2016).

P Platzer and K Klausner, 'Crowdfunding for Small Satellites' in I. Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

O Volynskaya and R Kasyanov, 'Launching Numerus Small Satellites- A Flourishing Business? The Case of the Russian Federation' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances*, (Nijhoff 2016).

R Sandau (ed), *International Study on Cost-Effective Earth Observation Missions* (Taylor & Francis 2006).

MN Shaw, *International Law* (6th edn; CUP 2008).

RD Sloane, 'Breaking the Genuine Link' (2009) 50 Harvard International Law Journal.

RG Steinhardt, 'Outer Space' in O Schachter and CC Joyner (eds), *United Nations Legal Order* (vol. 2; CUP 1995).

K-U Schrogl, 'A New Look on the Concept of the "Launching State"' (2002) 51(3) Zeitschrift für Luft und Weltraumrecht.

K-U Schrogl, 'The Launching State and the Registration Practice Resolutions as 'Kick Off' for a New Phase in Space (Soft) Law Development' in I Marboe (ed), *Soft Law in Outer Space: The function of Non-binding Norms in International Space Law* (Brill Nijhoff 2012).

K-U Schrogl and N Hedman, 'The U.N. General Assembly Resolution 62/101 of 17 December 2007 on "Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering space Objects"' (2008) 34 Journal of Space Law.

LJ Smith and Z Valic, *A Regulatory Roadmap for Small Satellites*, Proceedings of the 4S Symposium, Slovenia (05 June 2012).

M Swartwout, *The First One Hundred CubeSats: A Statistical Look* (2013) 2(2) Journal of Small Satellites.

M Trautinger, 'The Impact of Technology and Export Controls on Small Satellite Missions' in I Marboe (ed), *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff 2016).

K Woellert et al, 'Cubesats: Cost-effective Science and Technology Platforms for Emerging and Developing Nations' (2011) 47 Advances in Space Research.

Reports and Studies:

‘History of the CubeSat’ (*Space Daily*, report by staff writers, 23 August 2016).

Keck Institute for Space Studies, California Institute of Technology Pasadena, *Small Satellites: A Revolution in Space Science, Final Report* (2014).

Space Traffic Management Towards a roadmap for implementation, IAA Cosmic Study (2017).

SpaceWorks, 2017 Small Satellite Report: Trends and Market Observations (2017).

UK Space Agency, Reform of the Outer Space Act 1986: Summary of responses and Government response to consultation, (06 Dec. 2013).

M Williams ‘Legal Aspects of the Privatization and Commercialization of Space Activities Remote Sensing and National Space Legislation’, ILA Space Law Committee, International Law Association Toronto Conference (2006) Space Law, second report 2006.

Websites:

BRITE (satellite mission): <http://www.brite-constellation.at/>

CubeSatShop: <https://www.cubesatshop.com/>

ECSL: http://www.esa.int/About_Us/ECSL_European_Centre_for_Space_Law

ESA: <https://earth.esa.int/web/guest/missions/esa-operational-eo-missions/envisat/history>

FUNcube (satellite mission): <https://funcube.org.uk/>

Gauss (UNISAT 5 satellite Mission): <https://www.gaussteam.com/satellites/gauss-latest-satellites/unisat-5/>

GomSpace: <https://gomspace.com/gomx-3.aspx>

IADC: <http://www.iadc-online.org/>

IISL: <https://iislweb.org/>

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

ILA: <http://www.ila-hq.org/index.php>

ISIS: <https://www.isispace.nl/product/quadpack-cubesat-deployer/>

ISRO: <http://www.isro.gov.in/launcher/pslv-c37-cartosat-2-series-satellite>

ITU’s website: <http://www.itu.int/en/Pages/default.aspx>

JAXA: http://global.jaxa.jp/countdown/f15/overview/sub_payload_e.html

Kickstarter: <http://www.kickstarter.com/hello?ref=nav>

NanoRacks: <http://nanoracks.com/largest-iss-cubesat-deployment/>

NASA: <https://www.nasa.gov/centers/ames/missions/2007/genesat1.html>

OneWeb's website: <http://oneweb.world/>

Planet: <https://www.planet.com/company/>

PLD Space: <https://www.pldspace.com/>

QB50 (satellite mission): <https://www.qb50.eu/index.php/project-description-obj>

Rocket Lab: <https://www.rocketlabusa.com/book-my-launch/>

Samsung: <http://www.samsung.com/>

SMILE: <http://www.small-launcher.eu/>

SpaceX: <https://www.spacex.com/>

Spaceflight: <http://www.spaceflight.com/launch/>

SpacePharma: <http://space4p.com>

Spire: <https://spire.com/data/maritime/>

Sky and Space Global: <https://www.skyandspace.global/operations-overview/technology/>

Tyvak: <http://www.tyvak.com/launch-services/>

UN OOSA: <http://www.unoosa.org/oosa/ourwork/psa/bsti/>

University of Twente, Centre for Array Technology: <https://www.utwente.nl/ctit/cat/Projects/OLFAR/>

Vector Space Systems: <https://vectorspacesystems.com/technology/>

Virgin Orbit: <https://virginorbit.com/>

Zero 2 Infinity: <http://www.zero2infinity.space/bloostar/launch-your-satellite/>

Other:

S Aoki, 'Satellite Ownership Transfers and the Liability of the Launching States', IISL Symposium, Transfer of ownership of space objects: issues of responsibility, liability and registration, Vienna (19 March 2012).

BBC News: Ecuador Pegasus satellite fears over space debris crash (24 May 2013).

S Borenstein and S Birch, 'Crash of US, Russian satellites a threat in space' (*The Sydney Morning Herald*, 12 February 2009, updated 13 February 2009).

S Clark, 'Rocket Lab Chief Says Maiden Launch Result Maintains Pace for Commercial Service' (*Spaceflight Now*, 30 May 2017).

C Cofield, 'Vector Space Makes 1st Test Launch of Small-Satellite Rocket' (*Space.com*, 3 May 2017).

S Cole, *Small Satellites Increasingly Tapping COTS Components (Military Imbedded Systems*, 8 June 2015).

T Davis, *Operationally Responsive Space- The Way Forward*, 29th Annual AIAA/USU Conference on Small Satellites (2015).

C Dillow, *Here's Why Small Satellites Are So Big Right Now* (*Fortune*, 4 August 2015).

Ecuador Times: Pegasus satellite was declared 'lost' by EXA (05 September 2013).

S Erwin, 'At small satellite conference, frustration about lagging efforts to deal with space junk' (*Space News*, 5 November 2018).

K Finley, *Samsung Looks to Join the Satellite Internet Space Race* (*Wired*, 14 August 2015).

K Finley, 'Why the Space Democratization Movement Blows My Mind' (*Tech Crunch*, 1 September 2012).

J Foust, 'Astronauts Repair Space Station Satellite Deployer' (*SpaceNews*, 19 February 2015).

J Foust, 'Crowdfunding Space' (*The Space Review*, 15 April 2013).

J Foust, 'MarCO Success Vindicates Use of Cubesats on Deep Space Missions' (*Space News*, 26 November 2018).

J Foust, 'Space Station's Commercial Users Hitting Bottlenecks' (*SpaceNews*, 27 February 2015).

J Foust, 'UN committee approves space sustainability guidelines' (*SpaceNews*, 15 February 2018).

J Foust, 'Vector Tests Prototype Small Launch Vehicle' (*SpaceNews*, 3 May 2017).

S Freeland, 'Space Treaties are a Challenge to Launching Small Satellites in Orbit' (*The Conversation*, 16 April 2015).

J Gabrynowicz, 'Article IX of the Outer Space Treaty: Context and Considerations' 5th E. Galloway Symposium on Critical Issues in Space Law (Washington, 2 December 2010).

M Gruss, ORS Director: 'We're Not Here To Build Neat Toys' (*SpaceNews*, 10 March 2015).

N Horbach, *Liability Versus Responsibility Under International Law: Defending Strict State Responsibility for Transboundary Damage* (PhD dissertation, University of Leiden, 1996).

Inter-Agency Space Debris Coordination Committee (IADC), *Space Debris Mitigation Guidelines* (2002, as revised in 2007), IADC-02-01, Revision 1.

Inter-Agency Space Debris Coordination Committee (IADC), *Statement on Large Constellations of Satellites in Low Earth Orbit* issued by the IADC steering group IADC-15-03 September 2017.

M Iriarte, *COTS in Space? Not So Fast, Say Some Rad-hard Designers (Military Imbedded Systems)*, 15 June 2016).

A Knapp, *Google is Selling its Satellite Business Terra Bella to Satellite Startup Planet* (*Forbes*, 7 February 2017).

I Klotz, 'Rocket Lab Electron Booster Falls Short in Debut Test Launch' (*Space.com*, 25 May 2017).

H Krag, 'The Inter-Agency Space Debris Coordination Committee (IADC) – An overview of the IADC annual activities', 54th Session of the Scientific and Technical Subcommittee United Nations Committee on the Peaceful Uses of Outer Space (01 February 2017).

L Kratochwill, *First Satellite Built By High School Students Launches Tonight* (*Popular Science*, 19 November 2013).

T Masson-Zwaan, 'The (non-) Applicability of the Netherlands' Space Activities Act to certain 'Dutch' Space Activities', 6th Eilene Galloway Symposium, Washington D.C. (1 Dec. 2011).

A Matas, 'Small Satellite Regulation WRC-15 Outcome and Results of the ITU-R WP7B Studies' Small Satellite Symposium, Santiago, Chile, 7-9 November 2016.

S Mathewson, 'India Launches Record-Breaking 104 Satellites on Single Rocket' *Space.com* (15 February 2017).

S Marchisio, 'Article IX of the Outer Space Treaty: An Overview' The Fifth Eilene M. Galloway Symposium on Critical Issues in Space Law: Panel – Art. IX Background, 5th E. Galloway Symposium on Critical Issues in Space Law (Washington, 2 December 2010).

S Marchisio, 'Contribution of Space Law and Policy to Space Governance and Space Security in the 21st Century' 10th United Nations Workshop on Space Law, Vienna, 5-8 September 2016.

D Messier, 'SpaceX Files for FCC Approval for 4,425 Satellite Global Broadband Constellation' (*Parabolic Arc*, 16 November 2016).

D Mosher, 'SpaceX Just Asked Permission to Launch 4,425 Satellites — More Than Orbit Earth Today' (*Business Insider*, 17 November 2016).

D Leone, 'FAA Aims To Make Tag-along Payloads a Lighter Burden for Launch Providers' (*SpaceNews*, 22 January 2015).

J-C Liou, Modeling the Large and Small Orbital Debris Populations for Environment Remediation, 3rd European Workshop on Space Debris Modeling and Environment Remediation CNES HQ, Paris, France, 16-18 June 2014.

Y Okumura, An Introduction to the Questionnaire on Small Satellites of the Legal Subcommittee, United Nations/ South Africa Symposium on Basic Space Technology (13 December 2017).

D Paikowsky, 'What Is New Space? The Changing Ecosystem of Global Space Activity' (2017) 5(2) NEW SPACE.

N Palkovitz, 'Gaining Freedom, Losing Space' (*Leiden Law Blog*, 26 August 2014).

N Palkovitz, *Will YOU Own the Next Space Project?* (*Leiden Law Blog*, 17 August 2017).

Reuters, 'SpaceX Wants FCC Approval to Launch a Gigantic Satellite Internet Network' (*Fortune*, 17 November 2016).

PB de Selding, 'NanoRacks Identifies Root Cause of ISS Cubesat Deployment Failures' (*SpaceNews*, 2 October 2014).

A Slavinskis et al, *ESTCube-1 In-Orbit Experience and Lessons Learned* (2015) 30(8) IEEE Aerospace and Electronic Systems Magazine.

A. Soucek, 'Space Traffic Management' ICAO / UNOOSA Symposium, Abu Dhabi, 15–17 March 2016.

L Tennen and PM Sterns, 'Consideration of 'Heavenly Matters' and the Evolution of Article IX' 5th E. Galloway Symposium on Critical Issues in Space Law, slide 26 (Washington, 2 December 2010).

C Verhoeven, *Innovative Applications Pushing the Development of Small Satellite Technology: A vision on Extreme Miniaturization*, Small Satellites Tech, Business & Regulatory Industry Workshop, ESTEC, Noordwijk, The Netherlands (13 April 2017).

A Visser, Agentschap Telecom, Ministerie van Economische Zaken, Landbouw en Innovatie, Nano satellieten onder de Wet ruimtevaartactiviteiten (position of the Dutch telecommunications office with respect to authorization of space activities including nano-satellites) 16 April 2012.

M La Vone, 'The Kessler Syndrome: 10 Interesting and Disturbing Facts' (*Space Safety Magazine*, 15 September 2014).

D Werner, 'Small satellites are at the center of a space industry transformation' (*SpaceNews*, 22 August 2018).

R van Zyl, 'Cool Cubes are Changing the Way We Play in Space' (*The Conversation*, 18 May 2015).

Curriculum Vitae

Neta Palkovitz, born in Tel-Aviv, Israel, 1985. I am a commercial lawyer by training and an experienced adviser specializing in space law, regulatory affairs, and policy. Over the years, I have drafted and negotiated various complex agreements, while combining policy engagement and academic work. This combination provides me a valuable overview of the upcoming market and political trends relating to commercial space activities. I have published on regulatory aspects of non-governmental small satellites activities extensively, which led me to pursue a doctoral thesis on the topic on top of my daily legal practice.

I obtained my LL.B. from The College of Management, Israel, and graduated *cum laude* (2004-2008). Since 2009 I am an advocate, member of Israel Bar Association (licensed lawyer). I took coursework for an M.A. in Diplomacy at Tel-Aviv University, Israel (2009-2010), just before leaving Israel to study at Leiden University. There, I have obtained my LL.M. in International Air and Space Law, at the International Institute of Air and Space Law (IIASL), and graduated *cum laude* (2011-2012). I have been a Ph.D. candidate at the IIASL as of 2014 and until the present, 2019. Since 2011, I have been working as the Legal Adviser of ISIS- Innovative Solutions In Space B.V. and the ISIS Group, a private company engaging in designing, manufacturing and launching small satellites. I have also been a lecturer and visiting lecturer at the IIASL.