

THE SPACE LAW
REVIEW

FOURTH EDITION

Editor
Joanne Wheeler MBE

THE LAWREVIEWS

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Editor
Joanne Wheeler MBE

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PREFACE

The space industry was busy in 2022.

The US National Aeronautics and Space Administration's Artemis spacecraft finally reached the Moon, laying the foundations for future lunar exploration. Artemis 1 transported many small lunar research spacecraft – including Japan's OMOTENASHI lunar lander – as secondary payloads. South Korea's first lunar orbiter Danuri was launched into space by a Falcon 9 rocket, one of which also launched the Hakuto-R Mission 1, a private Moon mission by Japanese company ispace.

The year 2022 has also been busy for space tourism. Blue Origin's New Shepard launched six passengers on a suborbital trajectory in three flights. SpaceX's Crew Dragon space capsule launch was the first American space tourist mission to the International Space Station. The crew on board the Axiom Space-operated mission included one professional astronaut and three tourists.

China finished the construction of the Tiangong space station with the addition of the Wentian and Mengtian lab modules. Both Wentian and Mengtian were successfully launched and docked to the space station.

Boeing launched the second unmanned test flight of its Starliner space capsule. The test flight was successful and will lead the way for Starliner's first crewed test flight in 2023.

We are also seeing predicted consolidation in the industry, including the proposed merger between Viasat and Inmarsat, and between OneWeb and Eutelsat.

What particularly stands out to me is the increased recognition in recent years, and especially in 2022, of the value of space for our life on Earth and the view that space is very much part of our terrestrial ecosystem. This reached the public agenda at the United Nations (UN) Climate Change Conference in 2021, more commonly referred to as COP26, and also in 2022 at COP27. The value of space applications for methane and carbon measurements, monitoring and verification, for example, were clearly evidenced. Linked to this is the increasing recognition of the urgent need to protect the Earth and space environment. The growth in commercial activities and orbital populations has a large impact on the sustainability of long-term space activities.

Some companies are actively seeking out licensing regimes and regulators with clear procedures and processes that comply with space debris mitigation standards and sustainability goals. Licensing regimes that recognise environmental, social and governance (ESG) objectives can assist companies with raising finance, offer a better insurance risk and can allow market access in other jurisdictions. In fact, the UN Environment Programme Finance Initiative recently stated that it is part of a company's fiduciary duty to integrate ESG issues into its investment analysis.

The ecosystem comprising international guidelines, national implementation and commercial ESG concerns linked to investment is a powerful one. The international community must:

- a* enable more states to access and use outer space; and
- b* allow more – and more innovative – commercial activities to safely and sustainably use the space domain, benefitting life on Earth.

States and private entities must accept greater responsibilities and the need to ensure that such activities in space are sustainable. Effective national regulation that enables innovation and encourages investment while meeting international obligations is an increasingly important source of competitive advantage globally. This is especially the case when such national regulation embraces sustainability goals in relation to the mitigation of space debris and the protection of the outer space environment.

There is a related need for recognised standards that will ensure the safe and sustainable use of space-based equipment and operations, thereby increasing confidence for all who wish to develop their businesses and uses of space, including investors and insurers. Those involved in uses of space for science and research share the need for such a framework. To aid this, in March 2022, the International Astronomical Union announced the establishment of the Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference to coordinate and aggregate measures to mitigate the effects of satellite constellations on astronomy. More on the need to ensure space sustainability can be found in the jurisdictional chapters of this edition.

I am very pleased to say that this fourth edition of *The Space Law Review* contains contributions from three new firms: Zhong Lun Law Firm in China; Sorainen in Estonia; and Milbank LLP in the United States. It has been a pleasure to engage with these new contributors.

My thanks go to all the authors, who have contributed their time, expertise and enthusiasm to this edition. Their practical knowledge of their respective legal and regulatory frameworks – and related challenges, risks and solutions – makes this book unique. The contributors' expertise will grow in importance as the value of the space domain and the extent of space applications is increasingly recognised by states, the space industry, other industries and international organisations.

I am grateful to the contributors of *The Space Law Review* and wish them success for the years ahead in the space domain. I hope that readers will find this edition valuable and recognise the benefits that the international space industry can offer our life on Earth.

Joanne Wheeler MBE

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December 2022

ESTONIA

*Mihkel Miidla and Maarika Maripuu*¹

I INTRODUCTION TO THE NATIONAL LEGAL, REGULATORY AND POLICY FRAMEWORK

Of the five United Nations (UN) treaties on outer space, Estonia has only signed one: the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies 1967, which Estonia signed on 1 April 2010.² Estonia is planning to sign and ratify the Convention on International Liability for Damage Caused by Space Objects 1972 and the Convention on Registration of Objects Launched into Outer Space 1975.³ The Estonian state has no interest in joining the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968 or the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies 1979.⁴

In addition to this, Estonia has ratified the Convention for the Establishment of a European Space Agency 1975,⁵ the Agreement Relating to the International Telecommunications Satellite Organization 1971,⁶ the Convention for the Establishment of a European Organization for the Exploitation of Meteorological Satellites 1986,⁷ and the International Telecommunication Constitution and Convention 1992.⁸

Despite several attempts to create a Space Act,⁹ Estonia does not yet have a legal act dedicated to regulating issues concerning space. This means that there is no national legislation that would make the previously mentioned international acts binding at the national level. In 2020, the Ministry of Economic Affairs and Communications compiled an intention to elaborate a draft act on Estonian space objects, which has not yet gained the approval of other ministries and stakeholders.¹⁰

1 Mihkel Miidla is a partner and Maarika Maripuu is an assistant lawyer at Sorainen.

2 RT II, 2010, 9, 32. Available online: <https://www.riigiteataja.ee/akt/13299028>.

3 Ministry of Economic Affairs and Communications, 'Intention to elaborate a draft act on Estonian space objects' (2020), page 3.

4 *ibid.*

5 RT II, 7 July 2015, 2. Available online: <https://www.riigiteataja.ee/akt/207072015001>.

6 RT II, 2006, 29, 77. Available online: <https://www.riigiteataja.ee/akt/12758669>.

7 RT II, 17 June 2013, 1. Available online: <https://www.riigiteataja.ee/akt/217062013001>.

8 RT II, 2000, 12, 72. Available online: <https://www.riigiteataja.ee/akt/26331>.

9 M Maarits, 'Expert: Estonia needs a space law before the next satellite is launched', ERR Uudised (7 November 2017). Available online: <https://novaator.err.ee/641048/ekspert-eesi-vajab-kosmoseeadust-enne-jargmise-satelliidi-valjasaatmist>.

10 Draft Acts information system, dossier 20-1004. Available online: <https://eelnoud.valitsus.ee/main#9NEoQbNk>.

Since 2015, Estonia has been a Member State of the European Space Agency (ESA).¹¹ Although no official national space agency exists, the Estonian Space Office acts as Estonia's representative and business broker to ESA.¹² Estonia is the only ESA Member State that is not represented in the UN Committee on the Peaceful Uses of Outer Space.¹³

Space-related science is mainly coordinated by the Ministry of Education and Research. Various industrial activities are coordinated by the Ministry of Economic Affairs and Communications, which also has a sector dedicated to space.¹⁴

II REGULATION IN PRACTICE

In 2013, the first Estonian satellite, ESTCube-1, was launched. The aim of the mission was to develop local space technology and test an innovative electric solar sail. ESTCube-1 was developed by students as a part of an educational venture seeking to create the competence and network necessary for space technology. The mission ran from 2013 to 2015.¹⁵

ESTCube is planning to launch another satellite, ESTCube-2, in late 2022. The satellite has on-board Earth observation cameras to gather scientific information on green biomass. At the end of its mission, the satellite will be safely burned in the atmosphere using a solar sail.¹⁶

Students from TalTech started developing their own satellites, Koit and Hämariik, in 2014. Several students involved in this project had also taken part in the ESTCube-1 project. Koit was launched in 2019 and Hämariik a year later in 2020. Both satellites were launched with the aim of observing the Earth using RGB and NIR cameras. The RGB camera shows a colourful picture of Earth through visible light and the NIR camera shows information about the near-infrared spectrum, which is important for the monitoring of flora and climate.¹⁷

Due to lax legislative measures, Koit was launched without having requested or obtained permission from the state. ESTCube-1 was considered an educational mission, for which the UN does not require any special regulation.¹⁸

Estonian materials scientists have created a working group named Spaceprot Technologies, which uses nanotechnology to protect satellites from corrosion. Thanks to successful tests conducted on Earth, the working group is negotiating possibilities for a space test.¹⁹

ESA awarded a contract to the Estonian cybersecurity company Guardtime to improve the operational capability of ESA's space cybersecurity. Guardtime will provide security

11 RT II, 7 July 2015, 3. Available online: <https://www.riigiteataja.ee/akt/207072015003>.

12 See Estonian Space Office website. Available online: <https://eas.ee/eesti-kosmosebuuroo/>.

13 'Intention to elaborate a draft act on Estonian space objects', page 4.

14 Ministry of Economic Affairs and Communications, 'Estonian space policy and space programme development plan 2020–2027'. Available online: https://www.eas.ee/wp-content/uploads/2015/11/Eesti_kosmosepoliitika_A4_EST_web.pdf.

15 ESTCube team, 'ESTCube-1's journey to space'. Available online: <https://www.estcube.eu/blogi/ESTCube-1-teekond-kosmosesse>.

16 ESTCube team, 'Information regarding ESTCube-2'. Available online: <https://www.estcube.eu/projekt/ESTCube-2>.

17 TalTech, 'TalTech student satellites'. Available online: <https://satellit.taltech.ee/#/>.

18 'Intention to elaborate a draft act on Estonian space objects', pages 1–2.

19 R Aljas, 'Invention of UT scientists may reach space', Postimees (3 June 2016). Available online: <https://teadus.postimees.ee/3719269/tu-teadlaste-leiutis-voib-kosmosesse-jouda>.

engineering services required by ESA's Cyber Safety and Security Operational Centre Phase 1, which monitors the information and operations technology domains for ESA's space mission operations and assists the monitored entities in the case of a security incident.²⁰

In addition, Spaceit (an Estonian space start-up), CybExer Technologies and CGI Estonia have signed a contract with ESA to develop a cybersecurity-focused satellite operation simulator as a part of the ESA's General Support Technology Programme. The simulator allows ESA to develop, test and validate satellite connection systems in a controlled environment.²¹

CGI Estonia is also involved in the development of software, which aims to improve the design process of space mission ground stations. The project, Advanced Digital Ground Segment Engineering, sets out to minimise the time and money spent on the quality control of ground station designs.²²

Estonian scientists have created an optical periscopic imager for comets used as an instrument for the Comet Interceptor ESA F-class mission. The imager is a specialised camera that takes images of the nucleus of the comet and the dust around it.²³

In 2021, Globalstar developed a ground station in Kilingi-Nõmme. The location was chosen based on the objective of rounding out Globalstar's coverage in the Baltic region and the political and economic stability of Estonia. The ground station connects to low-orbit satellites, monitoring every one of Globalstar's satellites.²⁴

Estonia has developed a national satellite data centre called ESTHub, which enables users access to the Copernicus programme's data.²⁵

As of 2022, Starlink's internet connection can be ordered in Estonia. The coverage includes the entire country with a few exceptions.²⁶

As Estonians have already made their way into space, the lack of legislation poses several different practical problems (e.g., risks regarding liability when an Estonian satellite collides with another space object).²⁷

20 Guardtime press release, 'Guardtime awarded contract for European Space Agency Cyber Safety and Security Operational Center (CSOC)'. Available online: <https://guardtime.com/blog/guardtime-awarded-contract-for-european-space-agency-cyber-safety-and-security-operational-center-c>.

21 Press release, 'Estonian companies sign first contract in the field of space cyber defence'. Available online: <https://eas.ee/eesti-ettevotted-solmisid-esimese-lepingu-kosmose-kuberkaitse-valdkonnas/>.

22 'CGI Estonia creates software to design space missions for ESA', Delfi (3 February 2021). Available online: <https://forte.delfi.ee/artikkel/92450449/cgi-eesti-loob-euroopa-kosmoseagentuuri-jaoks-kosmosemissioonide-disainimise-tarkvara>.

23 See Tartu Observatory Space Exploration Group website. Available online: <https://tospexgroup.space/node/7>.

24 'US satellite company develop ground station in Kilingi-Nõmme', ERR Uudised (27 August 2021). Available online: <https://news.err.ee/1608319967/us-satellite-company-develop-ground-station-in-kilingi-nomme>.

25 Geportal, National Satellite Data Centre. Available online: <https://geoportaal.maaamet.ee/eng/Spatial-Data/National-Satellite-Data-Centre-ESTHub-p654.html>.

26 K Einama, 'Eesti on nüüd kaetud Elon Muski odava kosmoseinternetiga', Postimees (25 August 2022). Available online: <https://tehnika.postimees.ee/7591586/eesti-on-nuud-kaetud-elon-muski-odava-kosmoseinternetiga-starlinki-hinnad-tegid-suure-kukkumise>.

27 'Intention to elaborate a draft act on Estonian space objects', page 2.

III DISTINCTIVE CHARACTERISTICS OF THE NATIONAL FRAMEWORK

Estonian space law is in its infancy. This means that there are no legally binding acts regulating space-related issues despite Estonia having already launched three satellites and planning to launch another in late 2022.

IV CURRENT DEVELOPMENTS

Despite the current lack of regulation, Estonia has set out to create legislation regarding space. For instance, Estonia has a development plan regarding an Estonian space policy and space programme for 2020 to 2027.²⁸

The Ministry of Economic Affairs and Communications has compiled an intention to elaborate a draft act on Estonian space objects that would fill the gaps regarding registration of space objects as well as define the obligations and liability of the state and the owners and operators of the object. As part of that plan, Estonia is planning to sign and ratify two additional UN treaties.²⁹

V OUTLOOK AND CONCLUSIONS

Estonian space law is currently lacking in many areas. However, it is clear that the state is willing to take further steps to get comprehensive legislation in place.

28 'Estonian space policy and space programme development plan 2020–2027'.

29 'Intention to elaborate a draft act on Estonian space objects', page 3.

ABOUT THE AUTHORS

MIHKEL MIIDLA

Sorainen

Mihkel Miidla is head of Sorainen's technology, media and telecommunications sector, and the firm's data protection practice in Estonia. He provides extensive support to clients in all information technology (IT) and telecoms-related matters, especially in cases where IT and intellectual property are closely related.

MAARIKA MARIPUU

Sorainen

Maarika Maripuu is an assistant lawyer in Sorainen's dispute resolution and risk management practice. She assists senior colleagues with various cases related to dispute resolution, and has a deep interest in matters related to legislative processes, constitutional law and insolvency law.

SORAINEN

Rotermanni 6

10111 Tallinn

Estonia

Tel: +372 6 400 900

mihkel.miidla@sorainen.com

maarika.maripuu@sorainen.com

www.sorainen.com

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