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Space Law 2024

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Cécile Théard-Jallu, Francine Le Péchon-Joubert
and Michel Matas
De Gaulle Fleurance



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Global Practice Guides

Space Law

Contributed by

Cécile Théard-Jallu, Francine Le Péchon-Joubert
and Michel Matas

De Gaulle Fleurance

2024

Chambers Global Practice Guides

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CONTENTS

INTRODUCTION

Contributed by Cécile Théard-Jallu, Francine Le Péchon-Joubert, Michel Matas, Laetitia Cesari and Frédéric Destal, De Gaulle Fleurance p.4

CANADA

Trends and Developments p.8

Contributed by Fasken

FRANCE

Law and Practice p.17

Contributed by De Gaulle Fleurance

Trends and Developments p.33

Contributed by De Gaulle Fleurance

GERMANY

Law and Practice p.39

Contributed by HEUKING

Trends and Developments p.57

Contributed by HEUKING

INDIA

Law and Practice p.65

Contributed by Khaitan & Co

Trends and Developments p.86

Contributed by Khaitan & Co

JAPAN

Law and Practice p.94

Contributed by Nagashima Ohno & Tsunematsu

Trends and Developments p.114

Contributed by Nagashima Ohno & Tsunematsu

NORWAY

Law and Practice p.120

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Trends and Developments p.132

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PORTUGAL

Law and Practice p.140

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Trends and Developments p.164

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SINGAPORE

Law and Practice p.174

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Trends and Developments p.190

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SPAIN

Law and Practice p.198

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Trends and Developments p.216

Contributed by AUGUSTA ABOGADOS

UK

Law and Practice p.220

Contributed by Stephenson Harwood LLP

Trends and Developments p.242

Contributed by Preiskel & Co LLP

USA

Law and Practice p.249

Contributed by Holland & Knight LLP

Trends and Developments p.269

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INTRODUCTION

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De Gaulle Fleurance is a leading player in business law, with offices in Paris, Brussels, Geneva, and Abu Dhabi. The firm supports its clients with all their operations, both domestically and internationally. The team of 200 professionals brings together diverse experiences to build relationships based on excellence, responsiveness, and creativity. The firm's full-service practice enables it to address all legal and notarial challenges, and its expertise, notably in space law, is recognised by the business community through accolades from several famous profes-

sional guides. The firm's international culture allows it to mobilise a network of correspondents across every continent, ensuring comprehensive support for its clients worldwide. Among its activities to sustain the space economy, it is part of the European Space Agency's acceleration programme as members of the Business in Space Growth Network and has been selected as experts in the ESA's working programme for the governance of the future European Space Data Space.

Contributing Editors



Cécile Théard-Jallu is a partner at De Gaulle Fleurance, and a specialist in innovation and space law with a robust background in healthcare and life sciences regulations,

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INTRODUCTION

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INTRODUCTION

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A New Era for Space

The space industry has undergone a significant transformation. From being predominantly state-run in the 20th century, it has evolved into a primarily privatised sector with a burgeoning number of commercial players. Since the dawn of the 21st century, space applications have expanded beyond terrestrial uses, encompassing communication services, remote sensing and GNSS technologies. Stakeholders now recognise the growing importance of in-orbit services for refuelling and maintaining space objects, as well as services conducted directly in outer space. Moreover, alongside scientific exploration, mining activities on celestial bodies are emerging, prompting international discussions on their regulation.

While a series of international instruments provide a legal framework for state activities and guidance for domestic legislation, strict harmonisation is lacking. States must therefore co-ordinate their practices to avoid disrupting one another. This includes the freedom to use and explore outer space, subject to certain conditions, and the responsibility of states to authorise and supervise their national activities in space. However, it also entails an obligation to consider the activities of other states, communicate mission details, and ensure that the use and

exploration of outer space serves the common interest of humanity, fostering scientific, social, and economic progress.

Several states have established legal frameworks governing national space activities, such as the authorisation process for launching and operating space objects. In doing so, states must not only identify relevant activities but also anticipate future industry advancements. This includes considering evolving financing models, which increasingly involve public-private partnerships and investments, as well as accounting for technological risks and research and development needs.

Liability regimes are another crucial aspect of authorising space activities. States must assess and mitigate the potential risks their national operators may pose to other states' objects or activities in space. This involves providing adequate support and legal certainty for national operators to ensure their activities are conducted safely, securely, and sustainably.

Different space activities, such as remote sensing or transportation, have distinct legal considerations and requirements. These encompass a wide range of areas, including intellectual property, information technology, personal data pro-

INTRODUCTION

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tection, cybersecurity, contract law, financing, sectoral regulations, and insurance. This is also a concern for states with operators developing new technologies and applications in orbit, or those involved in future activities like celestial body mining, which will face additional legal complexities. Additionally, states must establish co-ordination mechanisms for the use of radio frequencies, essential for remote communication, data transmission, and orbital positioning of space objects. Adhering to existing regulations, particularly those set forth by the United Nations Office for Outer Space Affairs and the International Telecommunication Union, is paramount in ensuring responsible and sustainable space activities.

While some states, including the US, Canada, and several EU and Asian countries, have well-established legal frameworks for space activities, others are new entrants with dynamic strategies and comprehensive legal, industrial, and investment support programmes.

Some states actively participate in multilateral discussions aimed at developing international legal instruments for space activities. Others, or even the same states concurrently, are working towards regional legal frameworks, as exemplified by the EU's proposed EU Space Law.

The NewSpace era increasingly brings together stakeholders from diverse sectors, both within and outside the space industry. These participants hail from fields such as healthcare and life sciences, environment, energy, agriculture and food, mobility, and defence, each with unique legal needs and constraints.

NewSpace is also a data-driven economic landscape, necessitating the creation and management of multiple space data spaces that interact with non-space data spaces. This intricate interplay of data further diversifies the legal landscape, making it crucial to anticipate future industry needs and co-ordinate beyond traditional practices.

This guide aims to provide a concise yet comprehensive overview of these legal patterns in key countries worldwide. We extend our sincere gratitude to all contributors for their insightful contributions and to Chambers and Partners for their invaluable support in co-ordinating this landmark publication.

Sincerely,
The De Gaulle Fleurance team

CANADA



Trends and Developments

Contributed by:

Sylvie Bourdeau, Leslie Milton, Jean-Philippe Mikus, Jean-Raphaël Champagne, Amélie Béliveau, Julie Uzan-Naulin, David McLauchlan and Ralph Aziz

Fasken

Fasken is the largest law firm in Canada with over 950 lawyers and more than 1100 employees overall, across the firm. With regional representation in ten offices in Canada, the United Kingdom, and South Africa, it provides a global reach across three continents. Founded in Canada in 1863, Fasken stands on over 160 years of legal experience and operates in all major

business hubs in the country. Its team advises clients in every sector, including complex and high-profile matters across more than 80 practices and 50 industries. The firm finds solutions to the most complex legal and business issues and delivers exceptional value, putting the client at the heart of everything it does.

Authors



Sylvie Bourdeau practises in the area of business and mergers and acquisition law. Over the years she has been involved in numerous mandates involving the financial products and

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CANADA TRENDS AND DEVELOPMENTS

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Jean-Raphaël Champagne advises clients on issues related to commercial, regulatory and competition law. He assists a wide variety of players in the technology and life sciences

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Amélie Béliveau practises intellectual property law and commercial litigation. She is involved in all aspects of litigation, including drafting legal opinions and proceedings, and pleading before various courts. Amélie's work in intellectual property focuses on matters relating to trade marks, copyrights, defamation and the right to control one's own image. In her trade mark practice, Amélie assists clients with all stages of securing Canadian protection. She advises on selection and adoption of new trade marks and renders opinions on their availability and proper use. Amélie represents clients before the Registrar of Trade-marks and the Federal Court in opposition proceedings and other litigation.



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Introduction

Canada's history as a spacefaring nation began in 1962 with the launch of Alouette 1, making it the third country to design and build its own satellite. This milestone marked the start of Canada's significant contributions to space exploration and technology, which have included the robotic arms used on the Space Shuttle and the International Space Station. The nation's expertise in satellite communications, space robotics, and remote sensing has made it a key partner in international space missions, solidifying its reputation as a pioneer in space exploration.

That said, the law often engages with technological developments reactively rather than proactively, adjusting regulations and creating new frameworks after innovations have already begun to impact society. Canadian space law exemplifies this phenomenon. While the Canadian satellite communications industry is mature and highly regulated, other aspects of space utilisation, such as launches of spacecraft and human space exploration are relatively new in Canada. Consequently, the regulatory framework applicable to such activities remains underdeveloped and, as further discussed below, stakeholders may turn to the laws and regulations applicable on Earth for guidance.

In this vein, the most concrete recent developments in Canadian space law pertain to satellite telecommunications and much speculation remains in terms of issues such as the protection of privacy and intellectual property in space. An exception, however, may be the management of the risk associated with space debris, which Canada has addressed proactively through various mechanisms. This article will discuss these issues in turn in the following sections, concluding with the outlook for developments in the coming years.

Regulation of Satellite Communications

Background

The ownership and operation of space and Earth stations, as well as the provision of satellite transmission services in Canada, are regulated by the Minister of Innovation, Science and Industry Canada (the "Minister") and the Canadian Radio-television and Telecommunications Commission (CRTC). Canada also has a separate licensing framework for remote sensing space systems, which is administered by a section of Global Affairs Canada.

The Minister is responsible for issuing the necessary authorisations under the Radiocommunication Act for the use of radio frequency spectrum by satellites and Earth stations in Canada. The CRTC is responsible for regulating the provision of telecommunications services in Canada by telecommunications service providers, including satellite service providers, under the Telecommunications Act.

Radio frequency authorisations for the ownership and operation of satellite and Earth station facilities

In 2023, the Minister implemented a number of amendments to the licensing regime for Canadian-licensed satellites and Earth stations, including the introduction of generic Earth station spectrum licences.

All satellites that are under the direction and control of a Canadian corporation must hold a spectrum licence issued by the Minister authorising the use of the frequencies at an orbital location (in the case of geostationary orbit (GSO) satellites) or in accordance with other orbital parameters (in the case of non-geostationary orbit (NGSO) satellites). Licence holders do not need to be owned or controlled by Canadians, but corporate licence holders must be incorporated

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in Canada. Space station spectrum licences are issued on a first-come, first-served basis. In order to obtain a licence, a licence applicant must, among other things, demonstrate that:

- the satellite facilities will comply with Canadian spectrum allocation and utilisation policies and spectrum efficiency and Canadian coverage requirements;
- it will have the ability to perform certain direction and control requirements from within Canada; and
- it has a detailed orbital debris plan that satisfies international recommendations and guidelines.

The Minister has also established standard conditions of satellite spectrum licences. These conditions include deployment requirements, as well as ongoing obligations to comply with Canadian laws and spectrum policies, co-ordination obligations, payment of licensing fees and, in some cases, public benefit obligations. Fees are payable annually for a satellite spectrum licence, based on the band and the amount of spectrum that is licensed.

Satellites that are licensed by another country must obtain “market access” in order to communicate with authorised Canadian Earth stations. Market access will generally be granted to satellites licensed by WTO member countries if the frequency utilisation complies with Canadian spectrum allocation and utilisation policies, and Canadian co-ordination requirements have been met. There are currently no fees for market access.

Earth stations are now also authorised by means of a spectrum licence. The Minister issues site-specific spectrum licences for Earth stations operating in certain bands or that support cer-

tain activities, such as satellite feeder and telemetry, tracking and control links. The Minister also issues generic spectrum licences for user terminals, including Earth stations in motion, operating in certain frequencies. As with space stations, a corporation must be incorporated in Canada to hold an Earth station licence, but there are no Canadian ownership or control requirements. Fees are payable annually, based on the spectrum band and amount of spectrum authorised by the spectrum licence. Standard Earth station conditions of licence have been established by the Minister as well.

CRTC regulation

Satellite and Earth station operators that provide telecommunications services in Canada are subject to regulation by the CRTC. However, because the Commission has forborne from regulation of non-dominant carriers and has limited authority over resellers of telecommunication services, satellite services are not rate-regulated and are subject to light-touch regulation by the CRTC.

Licensing of remote sensing space systems

A separate licensing framework has been established under the Remote Sensing Space Systems Act, which was passed in 2006, for the operation in Canada of a remote sensing space system or the operation of such a system outside of Canada by a corporation incorporated in Canada. Licence applications for these operations must satisfy factors relating to national security and defence, international relations, and orbital debris. Licensed operators are subject to licence conditions that address control of the system, access to and control of data collected by the system, communication of non-Canadian data, use of cryptography and system disposal.

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Privacy Law in Space

The legal framework governing the protection of privacy in outer space remains unclear. While terrestrial privacy laws such as the EU General Data Protection Regulation (GDPR) and Canada's federal privacy legislation, the Personal Information Protection and Electronic Documents Act (PIPEDA), provide some framework for data protection, their applicability in space is uncertain. This ambiguity poses significant challenges for ensuring privacy and data security for both individuals on Earth and those venturing into space.

The distinction between airspace and outer space is therefore crucial when determining applicable privacy laws. Airspace is under the territorial sovereignty of the underlying state, while outer space, beginning at an altitude of 100 km, is not subject to any nation's sovereignty. Within airspace, both the GDPR and Canadian privacy laws apply, as this region falls within the sovereign territory.

For example, the GDPR applies, if an organisation has an establishment in the EU, regardless of whether the processing takes place in the EU or not. One might argue that the GDPR applies even in space, given that it applies to the processing of personal data regardless of where processing occurs. However, this must be read in the context of the GDPR as a whole, which only contemplates the transfer of personal data to third countries and to international organisations.

Similarly, PIPEDA applies to organisations that collect, use, or disclose personal information in the course of commercial activities in Canada or with a real and substantial connection to Canada. Likewise, the scope of provincial privacy legislation such as Quebec's Act respecting the protec-

tion of personal information in the private sector is framed in terms of an "enterprise" collecting, holding, using or communicating personal information in the course of business activities. This legislation may arguably apply to organisations that engage in such activities in space, though to our knowledge, there is no case law to support this position.

Given this legal uncertainty, the OECD Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data provide principles that are reflected in existing relevant legislation and may serve as a reference.

Regardless of applicable laws, privacy challenges in outer space are significant. These include the following:

- **Transparency** – Individuals on Earth must be informed if their personal information is stored on a satellite. This raises questions about the location and transfer of personal information.
- **Consent** – For astronauts and space tourists, obtaining free consent can be problematic. Whether it be space tourists or astronauts, participation in space activities or clinical trials on the International Space Station (ISS) may necessitate agreeing to share personal information, thus complicating the notion of voluntary consent.
- **Anonymisation** – Anonymising data in outer space is nearly impossible due to the limited number of individuals, making it easy to identify personal information.
- **Cybersecurity** – The cybersecurity of personal information is a critical issue. Recent cyber incidents highlight the vulnerabilities of satellites and underscore the severe consequences of attacks involving space assets.

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In summary, while terrestrial privacy laws provide some guidance, the unique conditions of outer space pose significant challenges that require careful consideration and potentially new regulatory approaches. A first step has been taken in this direction: a European Space Law legislative proposal is expected in summer 2024 and will focus on cybersecurity by design, in particular by providing consistent requirements for space safety, resilience, security and sustainability across the EU. Canadian regulators could draw inspiration from the European project.

Intellectual Property and Research and Development

The extent to which national intellectual property laws, including those of Canada, apply to outer space remains unclear, though it may depend on bilateral or multilateral agreements as further described below.

Under the 1967 United Nations Outer Space Treaty, objects (and associated personnel) launched into space and registered in Canada are subject to Canadian jurisdiction and control. Under Articles I and II of the Convention on Registration of Objects Launched into Outer Space a state must register a space object on its registry if the object is launched from its territory, or it procures the launch of the object. Approximately 85 in-orbit space objects currently appear on Canada's registry with early registrations pertaining to telecommunications and more recent registrations being focused on Earth observation. With the commercial spaceport in Canso, Nova Scotia, set to become operational in 2025, this number may increase. Objects registered in Canada could thus potentially fall under Canadian intellectual property laws. However, dispute resolution under the Outer Space Treaty occurs between member states and relevant interna-

tional organisations, with no explicit recourse to civil courts.

International treaties related to the International Space Station (ISS) did not extend Canadian intellectual property laws to outer space, as Canada has not contributed a specific module to the ISS. Instead, the laws of the country that contributed it apply to each module.

The Artemis Accords, signed by Canada in 2020, govern the Moon exploration programme led by the United States. These accords promote the open sharing of research data but do not include substantive provisions on intellectual property protection, leaving this issue to future bilateral agreements.

If a space object is launched from Canada, systems used in the launch could potentially infringe on patents. The importation of objects related to a space launch into Canada could also trigger patent rights infringement, as could mere possession of such objects under certain circumstances, as indicated by the *Monsanto v Schmeiser* case. Section 23 of the Canadian Patent Act provides an exception for the temporary or accidental entry of foreign inventions into Canada, though its applicability to space objects remains unclear.

Canadian and foreign entities should therefore secure intellectual property rights in countries with launch sites or active space programmes to maximise their protection and value.

Research and Development

Research and development (R&D) in space exploration in Canada is significantly driven by the Canadian Space Agency (CSA) through grants, contributions, and contracts. Funding opportunities for 2022–2027 target projects

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related to the lunar gateway, the Artemis project, planetary exploration, and space astronomy. In early 2024, the CSA announced the Space Technology Development Program, with a budget of CAD15 million to strengthen basic R&D into space technologies. Additionally, the 2024 budget included the Lunar Exploration Accelerator Program (LEAP), aimed at technological developments tied to the future lunar economy.

The National Research Council of Canada (NRC) also funds space-related R&D and, in 2023, signed a memorandum of understanding with the CSA to enhance co-operation. This collaboration was further supported by the creation of the National Space Council in 2024 to co-ordinate efforts across federal departments.

The CSA periodically issues challenges to the space development community, such as the deep space food challenge launched in 2021 in co-operation with NASA to develop sustainable food production systems for outer space. In early 2024, five Canadian companies were selected to build prototypes for a Connected Care Medical Module for space healthcare.

Canada's contributions to the Artemis project include the development of a next-generation robotic arm for the lunar gateway, by MDA, a leading Canadian space technology company. The CSA also continues to invest in Earth-orbiting satellite R&D, leveraging Canadian private sector expertise. In late 2023, the CSA announced a CAD1 billion investment over 15 years in the Radarsat+ initiative to gather information about Earth's oceans, land, climate, and populated areas.

Management of Space Debris

With the exception of the Remote Sensing Space Systems Act, Canada has largely taken a “soft

law” approach to managing space debris. Space debris refers to defunct satellites, spent rocket stages, and other fragments from the collisions or disintegration of space objects that orbit the Earth. It poses a significant concern because these pieces of debris can damage functioning satellites, space stations, and other critical infrastructure, potentially leading to cascading collisions and further increasing the amount of debris in orbit.

The Canadian Remote Sensing Space Systems Act, along with its regulations, mandates that operators of remote sensing space systems in Canada obtain a licence that includes a comprehensive satellite disposal plan. This plan must address the protection of the environment, public health, and safety, and comply with specific space debris mitigation standards. These standards require detailed information on the proposed disposal method, operation duration, risk assessments, debris projections, and hazardous materials.

In addition, the licensing regime for Canadian space stations aims to mitigate the risks associated with debris from this class of spacecraft. Licence applicants must submit a Space Debris Mitigation Plan. For geostationary satellites, the plan must comply with Recommendation ITU-R Section 1003-2, Environmental protection for the geostationary satellite orbit, while for non-geostationary satellites, the plan must adhere to the guidelines issued by the Inter-Agency Space Debris Coordination Committee (IADC). Compliance with these requirements is also a condition of space station spectrum licences.

Finally, the CSA adopted the IADC Space Debris Mitigation Guidelines in 2012 to mitigate space debris generated from its projects, missions, and activities. These guidelines are applied in the

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planning, design, construction, operation, and end-of-life phases of CSA projects, ensuring a comprehensive Space Debris Mitigation Plan is in place. In addition CSA satellites are licensed by Innovation, Science and Economic Development Canada and must comply with the conditions of the licence.

Outlook for Future Developments

Per the different topics covered in this article, it is clear that policymakers and governments will have to monitor commercial developments in space activities. Developing and furthering regulatory framework and international treaties will require a co-operative effort from the various stakeholders on a nationwide and international level.

To ensure it keeps pace, the government of Canada conducted a consultation process between 31 January and 4 April 2023 to seek views from stakeholders on these matters. Amongst the key themes addressed, it is not surprising that the consultation highlighted (i) the need to modernise the regulatory framework for space in light of emerging opportunities and (ii) the need to focus on supporting industry and encouraging innovation, aligning with international partners, prioritising sustainability, mitigating risks, striking the right balance on security, and streamlining administrative processes.

While the consultation was open to all Canadians, the government specifically sought input from stakeholders in specific space activities such as “Canadian businesses, especially those who are affected by Canadian space regulations or who are engaged in emerging space activities or space launch”. As alluded to above, the government of Canada has indicated that it intends to develop a regulatory framework for the authorisation and operation of satellite launch

facilities in Canada. Presently, these facilities are regulated under federal aeronautical regulation and it may take a couple of years before a specialised regulatory framework is promulgated. With the commercial spaceport in Canso, Nova Scotia, set to become operational in 2025, there is a clear need, and intent, to develop a Canadian framework for space launching.

In a similar vein, Canada has not specifically addressed the regulatory framework for the new satellite-to-mobile phone services that have been announced. Testing has been permitted under the Minister’s developmental licensing framework. The Minister may initiate a consultation to develop rules for satellite use of terrestrial mobile frequencies to support these new services. In this context, there will likely be calls to implement best practices and establish a clear regulatory framework to ensure that Canada remains an attractive destination for related businesses.

On a final note, it is clear that space activities represent promising business opportunities. We look forward to growth in specific space activities such as waste management and clean-up of space debris, remote sensing, satellite constellations, space tourism (suborbital or orbital flights), satellite services (including maintenance and disposal), space resource utilisation, and in-orbit servicing, assembly, and manufacturing. The space industry allows for a wide range of activities and partnerships for which companies and professionals can use their expertise to develop and explore as humanity continues to venture into space. Legal professionals will be called to provide advice in connection with the growth of commercial space activities, to provide tailored commercial agreements and to support the development of regulatory frameworks, and ultimately compliance with such frameworks.

FRANCE



Law and Practice

Contributed by:

Cécile Théard-Jallu, Francine Le Péchon-Joubert, Michel Matas,
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Contents

1. Global Trends p.20

1.1 The “NewSpace” and Space Tech Economy p.20

2. Existing Legal and Regulatory Framework p.20

2.1 Characteristics of the Space Industry p.20

2.2 Legal System and Sources of Space Law and Regulation p.21

2.3 Role of the State in Space Law and Regulations p.22

2.4 Role of the State in the Licensing Process for Space Activities p.22

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.22

2.6 Role of the State in the Launching Process p.23

2.7 Commitment to International Treaties and Multilateral Discussions p.23

2.8 Insurance and State Measures on Liability for Damages p.23

3. Rules Applicable to Space Operators’ Activities p.25

3.1 General Rules on Space Activities p.25

3.2 Principles of Non-interference and Prevention of Harmful Interference p.27

3.3 Operators’ Responsibilities p.28

4. Ownership of Extraterrestrial Resources p.28

4.1 Nature of Space Resource Rights p.28

4.2 Granting of Rights to Space Resources p.29

5. Environmental Protection and Impact on Climate Change p.29

5.1 Environmental Protection in Space p.29

5.2 Climate Change and Space Activities p.30

6. Taxation of Space Activities p.30

6.1 Tax System for Space Activities p.30

6.2 Tax Incentives for Space Investors p.30

6.3 Taxation on Sale or Transfer of Space Assets p.31

7. Investment and Financing in Space Activities p.31

7.1 Impact of “NewSpace” p.31

7.2 Finance Sources for Space Activities p.31

7.3 Attracting Investment for Space Activities p.31

7.4 Foreign Investment in Space Activities p.32

7.5 Role of Securities Markets in Space Financing p.32

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De Gaulle Fleurance is a leading player in business law, with offices in Paris, Brussels, Geneva, and Abu Dhabi. The firm supports its clients with all their operations, both domestically and internationally. The team of 200 professionals brings together diverse experiences to build relationships based on excellence, responsiveness, and creativity. The firm's full-service practice enables it to address all legal and notarial challenges, and its expertise, notably in space law, is recognised by the business community through accolades from several famous profes-

sional guides. The firm's international culture allows it to mobilise a network of correspondents across every continent, ensuring comprehensive support for its clients worldwide. Among its activities to sustain the space economy, it is part of the European Space Agency's acceleration programme as members of the Business in Space Growth Network and has been selected as experts in the ESA's working programme for the governance of the future European Space Data Space.

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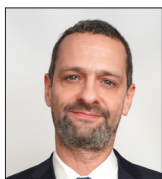
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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

France is involved in multilateral discussions concerning the space sector. In compliance with its international obligations, France has adopted national legal instruments that include measures relating to launching and operating space objects. Moreover, France participates in discussions at the multilateral level, including the United Nations, at the Committee on the Peaceful Uses of Outer Space and the Conference on Disarmament. France also has a varied industry that provides services to both its national and its international partners. It includes civil, scientific, military and governmental activities.

The French space legal framework is broadly stable (see below) but is refined/updated from time to time and may again be updated to comply with new space activities and applications and to include technical regulations fit to the industry's needs. As an EU member state, France will be impacted by legislative changes brought about at EU level by the announced EU Space Law if and when passed.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The French space industry is closely linked to the nation's aviation industry, and generates substantial revenue across civil, military and export markets. Major manufacturers such as Dassault Aviation and the Airbus, Thales and Safran groups are the main systems integrators in the defence aerospace industry, shaping the ecosystem directly or through joint ventures. France also has an integrated launch services provider, ArianeGroup, which faces challenges due to the decreasing launch costs driven by NewSpace entrants leveraging institutional contracts on a scale dwarfing those of European manufacturers.

The French Eutelsat Group is one of the world's leading satellite telecommunications operators and has been a European pioneer in space-based infrastructure for the transmission of television and radio content for more than 40 years. It works in concert with other national operators to deploy satellites across the country and offers a number of services. Moreover,

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it recently merged with OneWeb to expand its satellite offering.

Moreover, large groups such as Airbus also provide remote detection and satellite imagery services.

France is also much involved in European space research and development through the French Space Agency – ie, the National Centre for Space Studies (*Centre National d'Etudes Spatiales*, CNES) – and strong partnership links with the European Space Agency (ESA) – eg, the ESA's Business in Space Growth Network accelerator of innovative projects being run by the Institute for Space Medicine and Physiology (MEDES), which for nearly 35 years, has sought to maintain and develop French know-how in space medicine and physiology and to promote the applications of space research for health-care.

2.2 Legal System and Sources of Space Law and Regulation

The French legal system is based on civil law. France has a legal framework applicable to space activities in the form of the Space Operations Act, which dates from 2008. There are also texts relating to the Guiana Space Centre and the conduct of CNES's activities. Some guidelines govern certain satellite services, in particular the use of space data. French space law is essentially based on rules and the codification of measures dedicated to the space sector, notably including the French Research Code, the Post and Communications Code, the Intellectual Property Code, and the Defence Code. The following texts are among those that structure French space law:

- Law No 2008-518 of 3 June 2008, relating to space operations (LOS);

- Decree No 2024-625 of 28 June 2024, relating to space operations authorisation;
- Order of 28 June 2024, relating to the composition of the three parts of the authorisation file;
- Order of 28 June 2024, relating to technical regulations;
- Decrees No 2022-233 and No 2022-234 of 24 February 2022, relating to space data, defence considerations and the authorisation and management of space operations;
- Decree No 2017-1619 of 27 November 2017, publishing the agreement between the Government of the French Republic and the European Space Agency on the Guiana Space Centre and associated services;
- Decree No 2009-643 of 9 June 2009, relating to authorisations issued;
- Article L. 611-1 and L. 613-5 of the French Intellectual Property Code, which acknowledge patentability of invention achieved in space; and
- L. 613-5 of the French Intellectual Property Code which states that patent exclusive rights do not apply to objects intended to be launched into outer space introduced into French territory.

The commercial space industry is also particularly exposed to export control regulations, most space technologies being listed as either military or dual-use items under applicable laws (for EU-origin items, respectively under the national munition list and Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up an EU regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items). The complexity and extraterritorial effect of some national export control laws (in the case of the US International Traffic in Arms Regulations and Export Administration Regulations, for example) may

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create a substantial regulatory burden and trigger important compliance risks with consecutive penalties for companies and their managers. Among other things, releasing technical data and stuff training, tests and maintenance and repair operations can all be deemed as export or re-export. It is thus crucial that export control is taken care of in the commercial decision-making process in the initial stages of project design.

The French legal landscape is evolving under the influence of EU law, including with regard to data governance, data spaces, AI, cyber or the awaited EU Space Law that may be adopted in the coming months.

2.3 Role of the State in Space Law and Regulations

The French state is an operator, a facilitator and regulator of space activities. It participates in the work of the National Centre for Space Studies (CNES) and also has dedicated government military capabilities. It supports companies in the early stages of their activities, to ensure that their operations comply with the national legal framework. Additionally, the French state carries out scientific activities, notably in co-operation with other states or international organisations, as is the case with the European Space Agency, for example. While the French Ministry of Economy bears primary responsibility for space activities (including by authorising launches in outer space), the Ministry of Higher Education and Research oversees certain aspects, and the Ministry of the Armed Forces retains prerogatives concerning strategic and military operations in relation to outer space.

2.4 Role of the State in the Licensing Process for Space Activities

The authorisation and ongoing supervision of space activities is carried out under the Law on

Space Operations, which dates back to 2008. Operators are subject to an authorisation from the French Ministry of the Economy on the basis of a number of factors, including criteria relating to internal organisation, technical capabilities and financial resources, in order to ensure the reliability of their project. CNES supervises the review of launch authorisation applications and the work of the operators. With regard to their space objects: dedicated technical regulations exist to ensure their reliability and meeting technical criteria.

The administrative part of the authorisation is where the applicant is to be identified. They also need to provide moral, financial and professional guarantees, which themselves need to be assessed. The technical part includes a description of the space operation, systems and procedures envisaged. The third part is where the mission of the payload and its characteristics are described, while checking that the operation is not likely to compromise national defence interests.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

France's activities with regard to the distribution of radio frequencies fall within the framework of the International Telecommunications Union (ITU). The National Frequency Agency (*Agence Nationale des Fréquences*, ANF) provides stakeholders in space activities with a number of models to be completed in order to meet the requirements for the distribution of radio frequencies in orbit. This enables France to co-ordinate its national activities and reduce the risk of interference between space activities. The ANFR manages requests for frequency assignments relating to satellite systems. More specifically, it receives French requests, checks

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that they are compatible with the Radio Regulations and the National Table of Frequency Band Allocations, and then sends them to the ITU. ARCEP, the French regulatory authority for electronic communications, post and telecommunications, manages the market for satellite communications services.

Dispute resolution mechanisms are regularly based on diplomatic procedures within the ITU.

2.6 Role of the State in the Launching Process

In France, ArianeGroup provides launch services for governmental and non-governmental entities. Whether the activity is public or private, France provides its nationals, but also its international partners in French Guiana, a launch platform has been set up and is subject to specific regulations and supervision by CNES, while authorisations are granted by the French State.

2.7 Commitment to International Treaties and Multilateral Discussions

France has signed and ratified the main international legal instruments relating to outer space, including the Outer Space Treaty (1967), the Rescue Agreement (1968), the Liability Convention (1976), and the Convention on Registration (1977). France has also signed – but not ratified – the Moon Agreement. Furthermore, France has implemented the Space Debris Mitigation Guidelines adopted by the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), which include measures to minimise the creation of debris (ie, passivation and de-orbiting of satellites at the end of their lives). Moreover, France is also a party to the Guidelines for the Long-term Sustainability of Outer Space Activities, also adopted by the UN COPUOS, which aim to promote responsible practices when conducting space activities to ensure

their sustainability and safety. France complies with several of the recommendations of these guidelines. It also works with other countries and entities to enhance the safety of space activities and share critical data on space conditions and orbital events.

Space operators must obtain authorisation from the French government before carrying out space activities. This authorisation is granted after a rigorous assessment of the activities' compliance with international and national obligations. CNES is responsible for monitoring space activities to ensure that they comply with safety standards and international obligations.

2.8 Insurance and State Measures on Liability for Damages

The French state is responsible for space activities carried out by its entities, whether public or private. This means that, in the event of damage caused by a French space activity, the state can be held liable at the international level. The 2008 LOS provides a mechanism for transferring liability from the state to private operators. This enables the state to protect itself financially by transferring part of the liability to the companies carrying out space operations. However, this transfer is limited and subject to strict conditions. Companies must demonstrate their financial capacity to cover potential liabilities. The law also allows operators to include liability clauses in their contracts with partners and subcontractors. This includes indemnification and limitation of liability clauses aimed at clarifying respective responsibilities in the event of damage. CNES plays a crucial role in the implementation of this law. It is responsible for preparing the issuance of authorisations for space operations and checking that operators comply with financial and insurance requirements.

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Insurance Requirements

France imposes strict insurance and liability regulations for space activities aimed at providing a framework and security for this constantly evolving sector. French nationals and companies carrying out space activities under French sovereignty must be covered by insurance or have other financial guarantees approved by the competent authority. The 2008 LOS establishes a liability ceiling for space operators. Above this ceiling, the State guarantees cover for damage depending on the phase of occurrence (either during launch or after launch, including return to Earth). In fact, when the State compensates damage under the 1967 and 1972 Outer Space Treaties, it can take action against the operator responsible, provided that it has not already benefited from the operator's financial or insurance guarantees to the extent of the compensation. In the case of intentional fault, the ceilings do not apply. No recourse is available for damage resulting from acts against State interests. This authorisation and control system helps to reduce the risk of failure and to control other risks to people, property, the environment and public health, even in the event of failure. Reducing risks also improves the reliability of launch and orbital systems, which in turn optimises their technical and economic performance.

French space law defines damage as “any harm to persons, property, and in particular public health or the environment directly caused by a space object in the context of a space operation, excluding the consequences for users of the signal emitted by this object”. For example, cover for Ariane launchers is a minimum of EUR60 million, including no-fault liability for terrestrial damage and fault liability for outer space damage.

The LOS provides for a clear division of liability between the participants in a space operation.

There is no possibility of recourse between participants in the event of damage caused to each other or third parties in order to avoid a snowball effect. Contracts must, therefore, include clauses waiving recourse and warranty agreements. In the event of damage caused by a space operation or the production of a space object, the participants bound by a contract cannot be held liable unless otherwise stipulated for damage occurring during production or in the event of an intentional fault. This practice of waiving recourse clauses is common in the space industry.

In addition to the technical aspects, space insurance includes specific clauses on the performance of space equipment. The notion of “intended commercial purpose” requires the insured to prove that the satellite can no longer fulfil its commercial mission in order to receive compensation. Deviations in performance from a standard are covered, with compensation adjusted according to the percentage of failure. French law does not cover damage caused by pollution unless it results in damage to the ground, an explosion or a fire. However, environmental damage is included in the cover – up to EUR750 million. The insurance cover must be linked to the insured event. The loss must occur during the period of cover specified in the insurance contract. According to the French Insurance Code, insurance on assets must comply with the principle of indemnity, according to which the insured can only be compensated up to the amount of the loss. The compensation paid by the insurer is intended to restore the policyholder to the situation he or she was in before the loss occurred. The fundamental principle is that a person or company cannot enrich itself as a result of damage to the property it owns or operates. Consequently, the insurer's maximum liability is determined by the value of the

insured property. However, where the law applicable to the contract permits, it is possible to choose between cover based on the principle of indemnity or cover based on the “agreed value”. The agreed value, which is often used for high-value items, is the value of the insured property as agreed between the insured and the insurer at the time the policy is taken out or during the term of the policy. Goods are generally valued by an expert, particularly in the space industry, due to the complex technologies involved.

At the European level, Directive 85/374/EEC of 25 July 1985 harmonises the laws of the member states concerning product liability. Transposed into French law by Law No 98-389 of 19 May 1998, this directive establishes the producer’s no-fault liability for safety defects in the products it puts into circulation. This means that the producer is liable as soon as a defect in its product causes damage without the victim having to prove fault on its part. However, the victim must prove the causal link between the product defect and the damage. A product is considered defective when it does not offer the safety that can legitimately be expected and not because it is unsuitable for use. With regard to the space sector, Manufacturers and operators of space equipment must guarantee that their products comply with safety standards. In the event of the failure of a satellite or other space object, which results in damage, the principles of strict liability apply. This strengthens the obligations of space operators in terms of product safety and quality.

3. Rules Applicable to Space Operators’ Activities

3.1 General Rules on Space Activities Limitations on Space Activities

Under French law, there are no space-specific rules with an economic sector orientation. With NewSpace projects, for instance in the life sciences or agrifood sectors, the legal framework needs to evolve to adapt the existing Earth-orientated rules and guidelines to activities conducted in outer space or to the use of results or data triggered by such activities (for instance healthcare in or from space). International guidelines (for instance Good Manufacturing Practices or Good Clinical Practices) or national legislation (for instance the French Public Health Code) may partially be used but are not substantially adapted. Innovative NewSpace project owners require such adaptations in order for their projects to get legally secured and thus become eligible for private or public financing.

Data Protection in Space

French law does provide specific rules on space data when generated by satellites as per the above-mentioned Decree No 2022-233. Decree No 2022-233 modifies various provisions related to the management of authorisations for space operations. It updates the conditions and requirements for obtaining authorisation for a space operation to ensure compliance with national defence interests and regulations. It details the application submission process, defines the review process by relevant authorities, and establishes conditions for conducting and modifying space operations.

Among other provisions, Decree No 2022-233 provides that activities carried out by primary users of space-derived data involving data with the following characteristics are subject to the

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prior declaration stipulated in Article 23 of the aforementioned 2008 LOS:

- Earth observation data (from various panchromatic, multi-spectral or radar sensors or a certain level of intrinsic localisation accuracy).
- Data resulting from the interception of electromagnetic signals emitted from the Earth.
- Data:
 - (a) containing an image of a space object with a resolution of one meter or better;
 - (b) resulting from the interception of electromagnetic signals emitted from a space object; and
 - (c) relating to the location of space objects.

Decree No 2022-234 completes the framework by modifying the existing regulations governing space operations under Decree No 2009-643. It focuses on incorporating national defence considerations into the authorisation process for space activities. The decree provides for the necessary information and documentation required from space operators, the role of defence authorities in reviewing applications, and the conditions under which space operations can be adjusted or supervised to protect national defence interests. Moreover, it mentions exceptions to regulatory requirements for state-conducted operations.

Security in Space

French security law dedicated to Operators of Vital Importance (*Opérateurs d'Importance Vitale*, OIV) lays down a specific framework, which applies to space actors, obliging them to protect their infrastructure and information systems through a series of certification, audit and other technical and operational measures, under the supervision of the French government and the French Cybersecurity Agency (ANSSI).

Beyond French rules, EU level data-related rules apply, including NIS2, GDPR, the Data Governing Act or Data Act principles, as well as coming regulations on European “data spaces”. The ESA has launched a working programme on the operation and governance of the future European Space Data Space, which will interact with all other European data spaces, and which France is part of through a community of stakeholders. A blueprint will be presented in the coming months to the European Commission giving rise to further steps along the setting up and organisation of this space data space.

Based on the conclusions of hazard and impact studies, applicants for an authorisation shall draw up and implement risk control plans including an environmental damage prevention plan, a space debris mitigation plan, a plan to prevent the risks induced by the re-entry or recovery of launcher components from the space object or its fragments, a collision risk prevention plan, where applicable, a nuclear safety plan and a global protection plan, as well as emergency measures and eventually, cybersecurity measures.

The scope of the law extends to stand-alone space objects, such as satellites, as well as satellite constellations, understood as groups of co-ordinated space objects, and cases of controlled stage returns to Earth. The text includes the notion of a constellation, “a group of space objects composed of at least ten space objects working together for a common mission subject to a predefined in-orbit deployment plan” and which is qualified as a mega-constellation if it contains “at least 100 space objects”. The text also introduces the notion of in-orbit service, performed by a service vehicle requiring rendezvous, approach or contact phases with a target object, including operations such as inspec-

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tion, capture, docking, transfer into orbit, repair, assembly, transfer of fluids and undocking.

The procedure that operators must follow to obtain the necessary authorisations for their space activities, now applies to one or more space objects, considering that for multiple missions using deployers, the launch operator must specify the number and characteristics of the objects launched contained in the deployers and their mission.

In addition, the characterisation of space objects also includes space objects injected from a deployer after separation from the launcher.

With regard to in-orbit service operations, the description must show:

- the number of the different types of missions planned;
- the nature of the missions envisaged (type of services) and their duration;
- the customers benefiting from the service operation (operators whose satellites will receive the service) if they are known at the time of the application;
- the orbital configuration (orbit, attitude) that the service vehicle will occupy for each of the planned missions;
- transfers of the service vehicle between each mission; and
- any transfers of responsibility between the operator of the target object and the operator of the service vehicle.

Finally, it covers the possibilities of mission extension.

Cybersecurity

In terms of cybersecurity, the launch operator must implement measures to protect itself

against malicious cyber operations that could threaten regulatory compliance. Justifications for this approach and a summary of the security measures must be filed with CNES. Cybersecurity measures must also be implemented to prevent reception and conduct of unauthorised or unauthenticated remote controls on board. These provisions are supplemented by measures to secure on-board/ground and on-board/on-board in-orbit communications links, and to ensure that they are resilient to any corruption that could jeopardise the safety of operations.

3.2 Principles of Non-interference and Prevention of Harmful Interference

In France, the use of radio frequencies by licence holders is a private occupation of the state's public domain. These frequencies are subject to specific regulations, which are particularly influenced by international law. The frequency assignments necessary for the operation of satellite systems can only be used once they have been successfully declared to the ITU by a national administration. Title 4 of Law No 2004-575 of 21 June 2004 on confidence in the digital economy introduced a new Title 8 into Book II of the French Post and Electronic Communications Code, entitled "Assignment of frequencies relating to the satellite system". The Code now includes specific provisions for satellite systems (including space and earth stations). This law fills a gap in communications law by making the occupation of orbit-spectrum pairs subject to an authorisation regime. It transfers the rights to use these resources, which France has been allocated by the ITU, to satellite system operators. It provides companies developing satellite system projects with a clear legal framework, guaranteeing at an early stage the availability of one of the resources essential to their realisation.

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Authorisations are subject to proof of the operator's ability to control the transmission of all the stations using the frequency assignment, and may only be refused in certain cases listed in the French Post and Electronic Communications Code. This is without prejudice to the other authorisation formalities required by applicable laws and regulations, in particular those issued by ARCEP for electronic communications, or by ARCOM for audio-visual communications.

3.3 Operators' Responsibilities

The operator is the person who carries out or undertakes to carry out the activities covered by the law by ensuring, alone or jointly, the effective control of the space object. There is no legal requirement for operators (beyond the space debris management principles and other rules already mentioned above). However, the documents drawn up by CNES relating to the safeguarding of the Kourou Guiana Space Centre aim to protect the safety of people, property, public health and the environment for launches from the centre and contain prescriptions designed to limit the risks associated with space debris.

Additionally, French Law also refers to two other concepts:

- deployers – ie, “devices that carry one or more space objects as part of a multiple launch and inject them into the orbits requested by the customer(s)”; and
- reusable launchers – ie “self-propelled vehicles designed to place space objects into orbit [...] some or all of whose components undergo a recovery phase on Earth in order to be reused during a subsequent launch operation”.

Moreover, as far as it is concerned, The French intellectual property code states that objects

intended to be launched into outer space introduced into French territory are not subject to patent protection cf. Article L.613-5, in line with Article 5 ter of the Paris Convention of 1883 and with similar US provisions in order to prevent any risk of IP litigation for foreign satellites launched from French Guiana.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

France is party to the Artemis Accords, whose main principles are as follows:

- Peaceful exploration of space by signatories, in accordance with international law.
- Transparency in the conduct of activities “in the hope this prevents both confusion and conflict,” including when sharing scientific information with the public and the international scientific community on a good-faith basis.
- Interoperability so systems can work in conjunction with existing infrastructure to enhance both the safety of space operations and the sustainability of these missions.
- Emergency assistance by signatories to astronauts and personnel in outer space who are in distress.
- Registration of relevant space objects.
- Preserving heritage, including sites with historic significance such as human or robotic landing sites, artifacts or spacecraft.
- Extraction and utilisation of space resources from the celestial bodies should be realised to support safe and sustainable space exploration; such activities should be communicated to the UN Secretary General, the public, and the scientific community.

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- Avoiding conflicting activities, by preventing harmful interference and exercising the principle of due regard. Establishment of safety zones, under conditions.
- Safe timely and efficient disposal of space debris as part of the mission-planning process to limit the generation of new long-lived or harmful debris.

France's space activities must also be conducted in compliance with existing treaties, including the 1967 Outer Space Treaty, Article II of which established the principle of non-appropriation of outer space, including the moon and other celestial bodies by a State.

4.2 Granting of Rights to Space Resources

As per July 2024, there is no national law addressing this topic, even though France is party to the Artemis Accords.

It should be noted that the French Intellectual Property Code acknowledges that an invention made in space can be protected by French patent law (Article L. 6111-1).

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

Article 13 of the 2008 Space Operations Act stipulates that the operator is solely liable for damage caused to third parties by space operations. This includes any damage to persons, property, or the environment directly caused by a space object. Article 5 specifies that authorisations and licences issued under this law may be subject to requirements designed to protect public health and the environment, in particular, to limit the risks associated with space debris.

The Order of 31 March 2011 on technical regulations imposes specific measures to limit space debris, in particular during the launch of one or more space objects. The design, production and operation of launch systems must not present excessive risks to the environment, particularly with regard to pollution by hazardous substances. The launcher must be designed and implemented in such a way that, at the end of its service phase, all onboard energy reserves are permanently depleted or placed in a state where such depletion is unavoidable or in a state where they present no risk of generating debris. Moreover, all onboard energy production systems must be permanently deactivated.

After the launch phase, the components of the launcher placed in orbit must be de-orbited in a controlled manner. If this cannot be achieved, the components must leave Protected Region A within twenty-five years of the end of the launch phase, ideally by uncontrolled atmospheric re-entry or, failing that, by remaining in an orbit whose perigee remains above the Protected Region for one hundred years after operation.

The systems must be designed and implemented to limit the risks of accidental collision with human-made objects whose orbital parameters are precisely known and available during the space operation and the three days following the end of the withdrawal from the service phase.

The launch operator must control the re-entry zone for launcher components designed to detach during the launch phase or for the propulsion component placed in orbit as part of a controlled atmospheric re-entry. This zone, associated with a probability of 99.999%, must not interfere with the territory or territorial waters of any state unless agreed by the latter.

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Any operator carrying out a launch to another celestial body, whether or not this includes a return of extraterrestrial matter, must comply with the International Standard for Planetary Protection Policy published by the Committee on Space Research (COSPAR), in accordance with Article IX of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

With regard to retirement, satellites in the same constellation must incorporate measures to reduce the risk of intra-constellation collisions until their atmospheric re-entry or for 100 years in the approved graveyard zone. For mega-constellations, satellites must have an on-board propulsion system to enable anti-collision manoeuvres to be carried out effectively and in a timely manner until the end of their retirement. The measures also include the objective of limiting optical disturbances for astronomical observations from the ground or space.

For re-entries, the description in the authorisation file must include:

- a re-entry authorisation issued by the authorities responsible for the landing site;
- a description of the critical systems and sub-systems for the rescue mission;
- a description of the landing site and its facilities; and
- re-entry trajectories, flight sequence and triggering events, provisional date and re-entry window.

5.2 Climate Change and Space Activities

There is no applicable information in this jurisdiction.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

The standard French corporate income tax (CIT) is 25%. A 15% reduced CIT rate applies to SMEs on taxable income up to EUR42,500 (subject to various conditions, including EU thresholds and a maximum turnover of EUR10 million).

Under the participation exemption regime on capital gains, 88% of capital gains can be exempt, resulting in an effective CIT rate, of up to 4%.

For dividends, the participation exemption regime allows for exemptions of 99% or 95%, making the effective CIT rate between 0.25% and 1.25% for the 2024 fiscal year, provided the company is subject to the 25% CIT rate.

Under the tax consolidation regime, CIT is imposed on aggregate income, including the taxable profits and losses of all French companies within the consolidated group, necessitating a single CIT payment by the parent company.

6.2 Tax Incentives for Space Investors

As space cannot be considered a taxable territory by any country and is not covered by any international tax treaty, the taxation of profits from satellite operations is assessed solely by national tax laws. A French administrative court recently ruled that, in the absence of satellite autonomy from an operational management perspective, profits generated are taxable in France if substantial operations are conducted within French territory. This includes technical human interventions required in France for satellite maintenance, monitoring, operating performance, and commercialisation activities, particularly those involving the negotiation and conclusion of contracts with clients. The courts

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have deemed the satellite's value, even if significantly exceeding the cost of the French services rendered, to be irrelevant to the determination of tax liability in France.

Companies that are involved in research or innovation development activities may benefit from various CIT credit. Research activities include mainly fundamental research, applied research and experimental development. The tax credit is calculated based on the research expenses (eg, staff expenses, depreciation of fixed assets used in research), with specific adjustments. The research tax credit rate is 30% for expenses up to EUR100 million, and 5% for expenses exceeding this threshold. In cases of collaborative research involving subcontracting with special public research entities, the tax credit can reach 40% to 50% (for small companies) under certain conditions, calculated on a maximum of EUR6 million in expenses.

The innovation tax credit, available exclusively to small companies, primarily covers the design of prototypes and pilot plants for new products and is calculated at a rate of 30% on a maximum of EUR400,000 in expenses.

Finally, a reduced CIT rate of 10% may be optionally applied, subject to specific conditions, to the net income (royalties and capital gains) derived from patents and industrial property rights, including IT developments.

6.3 Taxation on Sale or Transfer of Space Assets

There is no specific tax regime that applies to space assets.

7. Investment and Financing in Space Activities

7.1 Impact of "NewSpace"

The volume of NewSpace companies have increased significantly over the years, encouraged in particular by a CNES project called "Connect by CNES". In addition, these ventures include innovative projects to ensure the sustainability of space activities by creating new systems and new ways of extending the lifespan of space objects, as well as new ways of raising funds, with the emergence of dedicated investment funds. In this way, certain organisations offer start-ups a favourable framework for understanding the challenges of the space market and integrating them, as well as securing more investment. We are now seeing a proliferation of this type of player, with traditional large companies and new start-ups working more closely together.

7.2 Finance Sources for Space Activities

On the whole, investment is predominantly public, but there are more and more opportunities to bring private funds into space activities. Moreover, the sector relies on customer contracts and future market prospects.

7.3 Attracting Investment for Space Activities

The EU also acts as a lever for intra-European private investment, although public-private partnerships are not always effective, as shown by the failure of the partnership envisaged for the Galileo programme. At present, the EU gives priority to funding programmes. In the current multiannual financial framework, several funds have been created, such as the European Fund for Strategic Investments, the European Regional Development Fund and the COSME programme for the competitiveness of busi-

nesses and SMEs. However, the diversity of funds available for private investment in the space sector lacks clarity, with no single fund clearly dedicated to this sector. To remedy this, in January 2020, the European Commission and the European Investment Bank Group launched the “Innovation Space Equity” pilot scheme to support the innovation and growth of European SMEs in space technologies. Since the Lisbon Treaty, the EU has actively sought to assert its ambitions in the space sector. However, there remains room for improvement compared to the European Space Agency, which demonstrates a clearer and more coherent approach.

7.4 Foreign Investment in Space Activities

States may adopt restrictive measures on foreign investments if they are justified on grounds of public policy, public security or public health. In this context, for security and public order, the Union indirectly protects intra-European private investments with a framework for the screening of foreign direct investments. Although

inspired by the legislation and practices of member states, this regulation provides a list of sectors potentially concerned, including the space sector. Member states and the Commission can determine the scope of filtering, taking into account the potential effects of these investments on critical infrastructures, such as transport, communications and aerospace, as well as on critical technologies and dual-use goods, including cybersecurity and aerospace. In France, the decree of 31 December 2019 on foreign investment sets out the procedure for controlling such investment, requiring authorisation from the Minister for the Economy. Thus, the technique of filtering through control of the potential effects of foreign investments on critical infrastructure and the authorisation requirement may indirectly protect intra-European investments and deter foreign investors.

7.5 Role of Securities Markets in Space Financing

There is no applicable information in this jurisdiction.

Trends and Developments

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De Gaulle Fleurance

De Gaulle Fleurance is a leading player in business law, with offices in Paris, Brussels, Geneva, and Abu Dhabi. The firm supports its clients with all their operations, both domestically and internationally. The team of 200 professionals brings together diverse experiences to build relationships based on excellence, responsiveness, and creativity. The firm's full-service practice enables it to address all legal and notarial challenges, and its expertise, notably in space law, is recognised by the business community through accolades from several famous profes-

sional guides. The firm's international culture allows it to mobilise a network of correspondents across every continent, ensuring comprehensive support for its clients worldwide. Among its activities to sustain the space economy, it is part of the European Space Agency's acceleration programme as members of the Business in Space Growth Network and has been selected as experts in the ESA's working programme for the governance of the future European Space Data Space.

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FRANCE TRENDS AND DEVELOPMENTS

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France's Ascendancy in the European Space Market: A Blend of Heritage and Innovation

France has historically been the leading space market within the European Union. Boasting 40% of the European space ecosystem, France is the birthplace of established industry leaders such as Ariane, Airbus, and Eutelsat. The French space market historically relies on fewer public resources compared to countries like the USA or China, where over 80% of revenues stem from public investments and procurements. In France, the ratio is closer to 50/50 between public and private funding. However, since late 2023, the French government has implemented an investment plan – “France 2030” – to support infrastructure and new tech projects, including space projects, with a dedicated allocation of EUR1.5 billion. This plan has identified and selected several projects for funding, encompassing satellite and micro-satellite launch services, satellite constellations, and in-orbit services.

More broadly, the French space market ecosystem, mirroring trends in other countries, is experiencing a surge of new entrants across all market segments, often referred to as NewSpace. These players utilise disruptive and cost-effective technologies, leveraging data to transform the market from a sovereign and concentrated

one to a more extensive landscape in terms of revenues and players. This evolution presents numerous new opportunities within the sector.

Satellite Launch Services

The satellite launch services segment exemplifies the NewSpace phenomenon. While the number of GEO satellites launched globally has remained relatively constant for decades, forecasts predict a surge in LEO satellite launches in the coming years, potentially reaching 500 to 1,000 annually. This growth creates the conditions for a robust market that is not solely dependent on public funding and intervention.

In France, 2024 marks not only the return of Ariane with the launch of Ariane 6, but also witnesses the emergence of five to six new launcher or micro-launcher projects within France and over ten within the European Union.

By the end of March 2024, the French government announced a EUR500 million investment in the development of micro/mini reusable launcher projects, aiming for a maiden flight in 2026. Four projects (Hyperspace, Latitude, Sirius and Maiaspace) have been selected, with public funding allocated through a procurement agreement for demonstration flights, with or without

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payload, with the French National Space Agency (*Centre National D'Etudes Spatiales*, CNES). The target launch cost is less than EUR10,000 per kilogramme in orbit. These projects were initially funded through private investment rounds organised by sector-focused business angels, such as Starburst in France.

Regarding Ariane, following the final mission of Ariane 5 in July 2023, France and the EU have been without an active launcher in the market, ceding the Western market to competitors, notably SpaceX's partially reusable Falcon 9. However, the first mission of Ariane 6 is scheduled for July 2024, and the development of a partially reusable Ariane is already underway.

Satellite Constellations

Several projects of satellite constellations or technologies for satellite constellations are currently being developed.

In the constellation segment, Eutelsat is currently preparing the second generation of its constellation of 648 satellites, OneWeb. Additionally, several new constellation projects are planned, such as IRIS, to be deployed by the EU by 2027. Following the success of Galileo, IRIS is estimated to cost EUR6 billion and will be dedicated to communications, space surveillance, and intelligence.

In the technology segment, France 2030 has selected three projects: two regarding antennas (Greenerwave and Anywaves) and one regarding innovative imaging solutions (Pyxalis).

In-Orbit Services

With the growing number of satellites, particularly the significant increase in LEO satellites outnumbering GEO satellites, in-orbit servicing is

emerging as a nascent industry with substantial potential. Key services in this sector include:

- Attitude and Orbit Control System (AOCS): extending satellite lifespan by providing essential propulsion and actuation capabilities;
- assembly: assembling, manipulating, and/or disassembling spacecraft parts from or into a satellite/vehicle;
- refurbishment: rehabilitating or servicing spacecraft by replacing aged or non-functional parts with new equivalents;
- manufacturing: producing spacecraft parts in orbit using raw materials and/or basic components from Earth and/or in-orbit recycling;
- refuelling: replenishing propellant for spacecraft already in space; and
- debris removal: mitigating the growing problem of space debris.

Numerous providers are actively developing and/or offering these services. One notable example is The Exploration Company, a Franco-German enterprise based in Munich and Bordeaux. They manufacture and operate a space capsule for both cargo and human-carrying missions, initially financed through private investment rounds before being selected for France 2030 and ESA missions.

Ground Services

The proliferation of satellites and service providers has ignited a thriving market for services based on data collected in orbit or transmitted through space. This encompasses a wide range of applications, including:

- surveillance and observation of Earth from space and of space from Earth;

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- research, development, and production in healthcare, life sciences, cosmetics, and agri-food industries;
- enhancement of new mobility practices;
- development of the greentech economy and renewable energies;
- observation and optimisation of industrial activities and flows;
- enhancement of telecommunication networks;
- strengthening defence and cybersecurity capabilities; and
- creation and governance of a space data space and its interaction with other sectoral data spaces.

This surge in data-driven services fosters the conditions for a sustainable value chain within the space industry.

The use of services from space is also undergoing a revolution with the advent of Device-to-Device (D-to-D) projects. These initiatives will enable end users to directly access communication services from satellites and constellations on their mobile devices, bypassing the need for ground stations and infrastructure.

Frequencies management (both in orbit and on the ground) and orbital positions will also become a hot topic in the following years.

Waiting for the Possible EU Space Law

In September 2023, the European Commission announced a potential landmark development for the European space economy: a new EU Space Law. This proposed legislation aims to harmonise the fragmented set of national regulations currently governing space activities across the EU member states, where only 11 national regimes exist.

The preparation started in 2021 with the launch of the EU Space Programme, grouping together a series of European projects in space, such as Copernicus, the Earth observation programme, and Galileo, Europe's solution for GPS navigation from space. In 2022, space was officially recognised as a strategic domain, leading to the EU Space Strategy for Security and Defence. This strategic programme aims to safeguard the continent's space interests by 2030 and explicitly mentions the potential for an EU Space Law to establish a "common framework" among member states.

To expedite the establishment of an organised single market for space activities, the European Commission is exploring the adoption of a legal instrument that would guide member states in harmonising their regulations. This initiative sends a strong political message regarding the development of sovereign capabilities in outer space and the strategic imperative for the EU to foster its space industry and maintain autonomy.

While the full details of this legislation are yet to be revealed, the proposed EU Space Law is expected to be founded on three fundamental pillars: safety, resilience and sustainability of space operations and systems.

Although progress was temporarily delayed in anticipation of the May 2024 EU parliamentary elections, stakeholders are eagerly awaiting the resumption of work on this landmark legislation. Its adoption is anticipated to harmonise the space legal framework, provide a foundation for EU member states lacking dedicated space regulations, and ultimately stimulate the growth of the European space economy.

In June 2024, France adopted a decree and two orders, published in anticipation of the

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amendment to the French Space Act 2008, as announced in early 2023, as part of a consultation with space operators on the challenges of NewSpace and the legal framework currently being developed within the European Union. These regulatory measures aim to pave the way for a smooth transition towards updating the applicable legal framework, while bringing national practices into line with the emerging EU Space Law.

Outerspace and Beyond?

Low Earth orbit and its industrial and innovative activities are not the sole focus of current and future exploration projects. The Moon, and eventually Mars, offer immense scientific potential and geopolitical significance.

To embark on this journey, Europe must develop its own soft-landing technologies for initial robotic missions. These missions will require remote units capable of exploring the sunless depths of potential water-bearing craters, necessitating highly advanced telecommunication capabilities. Additionally, Europe will need to test and develop systems and spacecraft designed to transport and sustain human life on the Moon.

The ESA has already taken steps in this new frontier by establishing a dedicated accelerator within its Business in Space Growth Network. This initiative focuses on supporting innovative Moon-related projects and aims to nurture the Moon champions of tomorrow. These champions will be selected based on their proven business models in terrestrial and/or space markets, as well as their capacity to develop applications for the emerging lunar economy.

GERMANY



Law and Practice

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HEUKING

Contents

1. Global Trends p.42

1.1 The "NewSpace" and Space Tech Economy p.42

2. Existing Legal and Regulatory Framework p.43

2.1 Characteristics of the Space Industry p.43

2.2 Legal System and Sources of Space Law and Regulation p.44

2.3 Role of the State in Space Law and Regulations p.44

2.4 Role of the State in the Licensing Process for Space Activities p.45

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.46

2.6 Role of the State in the Launching Process p.47

2.7 Commitment to International Treaties and Multilateral Discussions p.47

2.8 Insurance and State Measures on Liability for Damages p.48

3. Rules Applicable to Space Operators' Activities p.49

3.1 General Rules on Space Activities p.49

3.2 Principles of Non-interference and Prevention of Harmful Interference p.50

3.3 Operators' Responsibilities p.51

4. Ownership of Extraterrestrial Resources p.52

4.1 Nature of Space Resource Rights p.52

4.2 Granting of Rights to Space Resources p.52

5. Environmental Protection and Impact on Climate Change p.52

5.1 Environmental Protection in Space p.52

5.2 Climate Change and Space Activities p.52

6. Taxation of Space Activities p.53

6.1 Tax System for Space Activities p.53

6.2 Tax Incentives for Space Investors p.53

6.3 Taxation on Sale or Transfer of Space Assets p.54

7. Investment and Financing in Space Activities p.54

7.1 Impact of "NewSpace" p.54

7.2 Finance Sources for Space Activities p.55

7.3 Attracting Investment for Space Activities p.55

7.4 Foreign Investment in Space Activities p.56

7.5 Role of Securities Markets in Space Financing p.56

HEUKING is an independent, German, full-service law firm with more than 400 professionals and consistently ranks in top tiers of its fields of expertise. Operating in an international context, **HEUKING** co-operates with leading international advisors. Clients of **HEUKING** are national and international technology champions, investment stakeholders, institutions and government bodies. With over two decades of experience in advising space stakeholders, **HEUKING** has renowned expertise in technology-driven projects and plays a prominent role as an advisor for investments and start-ups. **HEUKING**

has consolidated its space related experience and expertise into one integrated focus-group “NewSpace & SpaceTech”, providing advice to space stakeholders in the areas including technology, data and space-enabled services; venture capital, M&A, financing and crypto-assets; satellites and telecommunications /ITU; public sector and procurement; FDI, merger control and regulators; compliance and policy developments; EU and international programmes, public funding; and risk management, liability and insurance.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

Legal Framework for Space

The overall picture regarding space activities in and beyond Germany is characterised by:

- the advance of the “NewSpace” economy;
- the increasing competition in the field of launchers, satellites and regarding the race to the Moon;
- a general realisation of the importance of space applications for both, climate (monitoring) and strategic autonomy; and
- an intensifying debate regarding safety, resilience and sustainability questions.

The NewSpace economy is still largely reliant on state and institutional ultimate end users. However, reports from renowned analysts suggest that at least the data-based and satellite-based economy is to a large degree self-sustaining. In addition, European and German national institutions are trying to push the commercialisation of space tech in various sectors through targeted programmes to facilitate the development of a self-sustaining economy.

The international legal framework can, from an EU perspective, be described as follows.

- The traditional areas of international law, where the United Nations Committee on the Peaceful Uses of Outer Space (UN-CPUS) initiative tries to facilitate an international legal framework regarding topics such as safety, utilisation of space resources, fair participation and sustainability.
- Multinational agreements, particularly the Artemis Accords, which appear to overtake at least some of the international laws in

terms of acceptance by signing – the Artemis Accords set forth principles for co-operative civil exploration and face criticism for – allegedly – contravening the Outer Space Treaty (OST) in terms of appropriation of space resources. Germany, although it signed the Artemis Accords on 14 September 2023, issued a statement at the same time affirming that it would nevertheless adhere to international law.

- National space laws, the number of which is increasing. Germany still has no national general space law. While a German space law is reportedly in the making, it cannot be predicted whether a draft will come out during the reign of the current German legislative body, which will end in 2025.
- The 2023 announced EU Space Law (EUSL), which was stalled in April 2024 at the last minute. It has now been announced that a draft EUSL will be subject to legislation procedures in 2025. The EUSL aims to enhance the safety, resilience, and sustainability of space operations. However, critiques question the EU’s authority to enact a harmonised legal framework.

Key Trends

In addition, the following are key trends for the German space sector:

- further technological developments regarding all areas related to technology for space situation awareness, space traffic management, Earth monitoring and space data security as well as regarding launchers, satellites, re-entry methods and space infrastructure;
- increasing competition between launch service providers due to the number of (micro-) launchers coming on-line within the next three years across the EU and worldwide, expected to result in price falls and increasing

launch flexibility and – as a result – the start of a consolidation process in the launcher market within the next five years;

- further development of spacetechnology in the areas of health, agritech and foodtech as well as material sciences;
- the increasing influence of space-specific regulation at both German and EU level in the areas of sustainability, safety and resilience, partly countering the foregoing; and
- tighter connections between space operators in the defence/dual use sector due to the need for security/defence autonomy.

Please refer to the [Germany Trends & Developments](#) chapter of this guide for further discussion.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The German space industry has a long history and is known for its capacity for engineering, base research capabilities and technological leadership. Between 2016 and 2020, Germany was ranked fifth world-wide with respect to issuing space-related patent applications, accounting for around 8% of applications globally.

According to data from the German Aerospace Industry Association (*Bundesverband der Deutschen Luft- und Raumfahrtindustrie e.V.*, BDLI), German space-related commercial revenues totalled EUR2.6 billion in 2022. The number of students beginning air and space technology degrees at German technical universities is also noticeable increasing.

Germany's research institutions for Space and Germany's space businesses are known for their

focus on base research as well as the development and manufacture of components, and complete systems for general space applications such as navigation, earth observation, meteorology, and communications as well as for propulsion technology. The German space industry is one of the most important partners for the development and operation of the European satellite navigation system Galileo. In addition, the German space industry is significantly involved in the development and production of components for the European Earth observation system Copernicus and several of the Sentinel satellites used for this purpose have been integrated by German manufacturers. The German space industry is a partner in the development and operation of the European MetOp and Meteosat weather satellites. It is also a key partner in Alphasat, currently the largest and most powerful telecommunications satellite of the European Space Agency (ESA). In addition, German corporations are involved in the development and production of parts for the Artemis mission and are partners in one of the successors of the International Space Station (ISS).

Besides established companies, the German space industry consists also of a growing number of small and medium-sized enterprises as well as a prolific start-up scene with – in 2023 – the highest number of such endeavours in the EU. These start-ups are often connected to technical universities.

The German government, through the German Space Agency (*Deutsches Zentrum für Luft und Raumfahrt*, DLR) supports research and commercialisation. Furthermore, German federal states (*Bundesländer*) have their own space-related grants and programmes. In addition, universities facilitate research projects. Finally, there are four ESA Business Incubation Cen-

tres already active in Germany and a number of further acceleration and incubation centres. The landscape for incubation and acceleration is wide and dense.

Regarding launch systems, 2024 has already seen a successful test-start by one of the three bigger German launching start-ups and is expected to see test starts from two German competitors in 2024. There are also plans to establish a mobile launch system in the North Sea so that Germany will, in future, possibly have access to certain orbits from within its exclusive economic zone.

2.2 Legal System and Sources of Space Law and Regulation

Legislation

The German legal system is based on civil law. Germany currently does not have its own designated “Space Law”, although one has been announced in the German federal government’s National Space Strategies (*Raumfahrtstrategien der Bundesregierung*) in 2023. However, there is currently no clear view on the timing. The applicable regulations on Space Projects are therefore scattered throughout non-space-specific national laws and international law.

In the absence of any consolidated national space legislation, the regulatory landscape in Germany is patchy:

- spacecrafts, rockets, and similar objects are considered aircraft according to Article 1 paragraph 2 sentence 2 of the German Air Traffic Act (*Luftverkehrsgesetz*, LuftVG) as long as they are in airspace;
- the use of frequencies and orbital slots for operating satellites is regulated in the Telecommunications Act (*Telekommunikationsgesetz*, TKG);

- with respect to data security in satellite communication, the Satellite Data Security Act (*Satellitendatensicherheitsgesetz*) and the Satellite Data Security Regulation (*Satellitendatensicherheitsverordnung*) are applicable; and
- enterprises that produce goods or technologies intended for use in space flight or for use in space infrastructure systems are subject to the Foreign Trade Regulation (*Außenwirtschaftsverordnung*, AWV), which may require a permission for foreign investments in these companies.

In addition, the planned EUSL (see 1.1 The “NewSpace” and Space Tech Economy), with its impact on Germany, is expected in 2025.

Case Law

Case law as such plays no role in Germany. The higher and supreme court’s judgements are not binding on lower courts, although they are usually followed.

2.3 Role of the State in Space Law and Regulations

Germany acts as a regulator with respect to the assignment and licencing of orbits and frequencies, aviation law, rules governing the use of satellite data, the implementation of ratified international laws and treaties and the further specific and generally applicable legislation.

Germany is a participant in space activities through its memberships in the ESA, of which Germany is one of the founding members and the biggest funding contributor in 2024, and through its participation in the European Union Agency for the Space Program. ESA astronauts are trained partly in Germany and German astronauts have visited the Russian space station MIR and the ISS. Germany actively participates

in space exploration (Mars Express and Rosetta Missions) and the Artemis programme.

The German state facilitates space activities by means of funding the ESA and the DLR and through its National Programme for Space and Innovation (*Nationales Programm für Weltraum und Innovation*, NPWI), which is managed by the DLR. In addition, Germany is a facilitator of international collaboration. Finally, Germany provides infrastructure support for space launches, satellite operations, and research activities and hosts ground stations for communication with satellites in orbit.

Government Agencies Regulating Space

Space activities fall within the overall responsibility of the Federal Ministry for Economic Affairs and Climate Action (*Bundesministerium für Wirtschaft und Klimaschutz*, BMWK), where the federal government co-ordinator of German aerospace policy is based. The BMWK acts through the DLR.

The DLR is the acting space agency of Germany. The DLR is responsible for preparing German space planning, for implementing German space programmes, as well as representing German space interests in the international area. To achieve these goals, the DLR develops and manages, among others, the NPWI, co-ordinates technology and space-related projects and independently performs functions in the administration of government-funded subsidies.

The DLR employs around 11,000 individuals. It has 55 different institutes and subsidiaries and numerous other test and operating facilities at a total of 30 locations in Germany and four foreign offices. The DLR's budget for its own research and development work and for operational tasks amounts to an aggregate of more than EUR1.37

billion euros per financial year (all figures are from 2022).

2.4 Role of the State in the Licensing Process for Space Activities

In Germany there is no comprehensive general space law governing space activities. This absence means there is no overall and binding licensing process or system of supervision in place for space activities in general.

The DLR attempts to gather and relay necessary information to the United Nations Office for Outer Space Affairs (UNOOSA), but the above-mentioned legislative gap creates legal uncertainties in various areas.

For certain very specific space activities, however, there are established authorisation frameworks.

- The operation of advanced space-based earth remote sensing satellites requires authorisation from the Federal Office for Economic Affairs and Export Control (BAFA) under Section 3 of the Act on Satellite Data Security Act (SatDSiG).
- The use of frequencies and orbital slots for satellites must be authorised by the *Bundesnetzagentur* (BNetzA) as per the TKG (further described in 2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots).
- The LuftVG classifies spacecraft, rockets, and similar objects as aircraft when traversing airspace. Such vehicles are subject to LuftVG regulations and must only take off and land at approved airfields, overseen by the German Aviation Administration (LBA). Although registering space objects with the LBA is voluntary, it is highly recommended in prac-

tice because registered objects are typically granted permission to use German airspace.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

Radio Frequencies

The use of frequencies is regulated by the TKG. Individuals or entities residing in Germany or having their registered office therein, who want to use frequencies through space objects are subject to the obligations arising from the Constitution and Convention of the International Telecommunication Union (ITU). The Federal Network Agency (*Bundesnetzagentur*, BNetzA) is responsible for allocating and managing radio frequencies and orbits and co-ordination with the ITU regarding applications from Germany. This includes satellite communications, Earth observation, and navigation systems.

Frequency and Orbital Slot Allocation

The BNetzA carries out the registration, co-ordination, and notification of satellite systems with the ITU upon request and transfers the resulting rights to use frequencies and orbits to the applicant.

The transfer of usage rights requires that frequencies and orbits are available for use, that there is compatibility with other frequency uses and other registrations of satellite systems and that public or third-party interests are not impaired.

The details of the application process are regulated in the Administrative Regulations for the Registration, Coordination and Notification of Satellite Systems (*Verwaltungsvorschrift für die Anmeldung, Koordinierung und Notifizierung von Satellitensystemen im deutschen Namen und für*

die Übertragung der Orbit- und Frequenznutzungsrechte, VVSatSys).

The required procedures include inter alia:

- a submission by the space operator to BNetzA, requesting a filing to the ITU and the initiation of co-ordination proceedings;
- the space operator providing proof regarding availability of funds (for costs of ITU proceedings) and of qualified staff for required assistance;
- provision of further information, including a business and technical plan regarding the use of the allocated orbits and frequencies, also setting out an explanation regarding use and avoidance of infringements; and
- a binding statement regarding compliance with ITU rules.

Conflict Resolution in Cases of Interference

Space operators must apply to the BNetzA for radio frequency use and orbits as outlined above. The BNetzA registers, co-ordinates, and notifies the ITU of the systems and plans, and assigns the corresponding orbit and frequency usage rights to the applicant.

Moreover, the BNetzA monitors frequency utilisation, as stated in Section 103, paragraph 1 of the TKG. To maintain effective frequency regulation, the BNetzA has the authority to issue orders that restrict or stop the operation of devices if necessary.

The decisions of the BNetzA on the assignment of frequency and orbit rights or on restrictions are issued by way of administrative acts, including decisions on infringements.

2.6 Role of the State in the Launching Process

Germany currently lacks a dedicated rocket launch site, largely due to its relatively short and densely populated coastline. Launching rockets over the ocean minimises the risk to human populations and infrastructure. In the event of a failure or explosion during the launch, debris is more likely to fall into the sea, reducing the potential for casualties and damage. Therefore, current plans include launching rockets from a floating platform in the North Sea. Test launches are scheduled for 2024. This offshore site is managed by the German Offshore Space Alliance (GOSA) and represents a significant step in the commercial development of Germany's launch capabilities.

The role of the state in launching space assets has largely been as a legislator (through the applicability of the LuftVG and applicable other general laws, such as the TKG and the Satellite Data Security Act. Further, through its ground stations and through services provided by the DLR and by grants and permits, the role of Germany is also that of a facilitator.

Finally, the German state is also a user of launch services in the sense that, for instance, satellites of the German armed forces, are procured and launched with services from private actors (and in the future potentially with the help of German micro launchers), as are satellites and satellite components for research and meteorological and climate-monitoring missions.

2.7 Commitment to International Treaties and Multilateral Discussions

Space Treaties to Which Germany Is a Party

Germany is a party to the four principal UN space treaties: the OST, the so-called Rescue Agreement (ratified 17 February 1972), the Liability

Convention (ratified 18 December 1975), and the Registration Convention (16 October 1979). Germany is not a party to the Moon Agreement.

In addition, Germany is party to the following international treaties and agreements:

- the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (1964);
- the Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT) (1973);
- the Convention on the International Mobile Satellite Organization (1979);
- the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite (1979);
- the Convention for the Establishment of a European Space Agency (1980);
- the Convention Establishing the European Telecommunications Satellite Organization (EUTELSAT) (1985);
- the Convention for the Establishment of a European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) (1986);
- the Constitution and Convention of the International Telecommunication Union (1994);
- the International Space Station Intergovernmental Agreement (1998);
- the Cape Town Convention (signed, but not ratified) and Space Protocol (signed, but not yet in force since not ratified by enough countries); and
- the Artemis Accords (signed by Germany on 14 September 2023).

Committee on the Peaceful Uses of Outer Space

Germany is a member of the Committee on the Peaceful Uses of Outer Space (COPUOS). Germany contributes expertise, shares best practic-

es, and collaborates to address key issues such as space debris mitigation and space observation and exploration.

International Law and Private Liability

According to Article 25 of the German Constitution (*Grundgesetz*, GG), the general rules of international law shall be an integral part of federal law, shall take precedence over other laws and directly create rights and duties for the inhabitants of the federal territory. For certain international treaties, Article 59 paragraph 2 sentence 1 of the GG requires the participation of the Bundesrat and Bundestag in the form of a “treaty law” prior to ratification by Germany. International treaties have been ratified (or not ratified) as outlined above.

In the absence of a national space law, there is no particular legislation addressing the question of liability or the role of private stakeholders in general.

The UN Space Debris Mitigation Guidelines are applicable to Germany, but there is no implementation into national law and so the guidelines are not legally binding. In the absence of a liability regime, the German state will therefore be fully liable in accordance with Article VII of the Outer Space Treaty without clear path for reimbursement from the space operator.

Due Regard

Germany has not adopted a national space law that would define and implement in detail – beyond general obligations from international law – the principle of due regard from international treaties such as the OST and the Liability Convention (1972), to which Germany is a party.

2.8 Insurance and State Measures on Liability for Damages

Besides the – to a certain extent – applicable LuftVG. and general applicable law, Germany has no specific space-related laws or legal instruments regarding prevention or indemnification of damage specifically caused by space activities. There are also no specific mandatory insurance requirements for space operators under German law.

However, if space objects are airborne and are therefore considered aircraft under the LuftVG, liability insurance to cover liability for damages due to the death, bodily harm or damage to the health of an individual not carried in the aircraft and the destruction or damage to an item not carried in the aircraft is mandatory according to Section 2 of the Air Traffic Act.

Scope of Coverage and Liability Caps

While there is no specific law dedicated to insurance for space activities, space operators must adhere to general insurance principles outlined in relevant legislation and will in general require:

- first-party asset insurance, covering transfer to launch, launch, vehicle flight, (limited) in-orbit-time (depending on space asset) and commissioning; and
- third-party liability insurance, covering launch liability, in orbit and de-orbit liability, all as resulting from space activities.

Typical exclusions are the results from war, anti-object devices, wilful acts (including interference) and unlawful seizure or control. Third-party liability and loss of revenue are, in certain cases, also excluded, depending on the space asset and insurer in question.

The Space Liability Convention, to which Germany is a party, does not provide for a maximum liability limit. Further, Germany, in the absence of a general national law, does not provide for liability thresholds. As a result, provisions in contractual agreements are the main source of liability thresholds and caps between the parties to such agreements.

Risks and Premiums

The insurance market for space activities is an international one led by only a few insurers (including reinsurers) and international insurance brokers. The insurance market is particularly difficult for new space operators with as yet unproven technologies, leading to restrictions on the availability of insurance.

Risks are assessed based on technical factors and commercial/external factors, such as mission criteria, technical complexity, launch vehicle and technical history, redundancy, margins and single point failures, as well as on insured sum, loss criteria and the general market conditions.

It is a specific feature of the space insurance market that each insurer assesses the specific risks based on its own due diligence and data, which suggests inefficiencies in terms of the cost of a typical insurance policy involving a consortium of insurers.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities Limitations on Space Activities

The launch of a space object will require the permission of the local aviation authority, since the LuftVG requires the compulsory use of airfields for any "aircraft", a category which also includes

space vehicles, and the establishment of an airfield requires a permit.

Apart from that, general law with its restrictions and requirements applies. There are not yet any laws specifically restricting activities in areas such as healthcare and life sciences, agri-food, mobility, the environment or energy. For instance, remote treatment (telemedicine) is not generally excluded, but the discussions around this topic have not yet focussed on space. These topics are seen as areas where the commercialisation of space technology has a huge potential. For example, when it comes to crop monitoring, precision farming techniques, and environmental monitoring, accuracy of navigation and autonomous vehicles, safety of maritime transport, environmental monitoring and pharmaceutical developments in space.

Data Processing

In Germany, the Act on Satellite Data Security (SatDSiG) was implemented on 1 December 2007. This legislation aims to ensure that earth observation data from high-quality German satellites does not compromise the national security of Germany or its allies. According to the SatDSiG, supplemented by the Satellite Data Security Ordinance (SatDSiV), if a space-based remote sensing system (usually a satellite equipped with remote sensing sensors) is classified as a high-quality system, both the satellite operator and the data supplier must each obtain approval from the German authorities. The Federal Office for Economic Affairs and Export Control (BAFA) serves as the competent authority for granting these approvals. The technical criteria determining which satellites are subject to the SatDSiG are outlined in the SatDSiV. Furthermore, the SatDSiG also governs data providers wishing to distribute earth observation data, requiring them to obtain a licence.

Presently, the SatDSiG's scope is relatively narrow, affecting only two German satellites, both operated by the DLR. Additionally, the regulation applies to two German data providers: the DLR's data centre for scientific data use, and Airbus DS Geo GmbH, which has commercial rights to the data.

Cybersecurity

Neither the EU nor Germany have regulations on cybersecurity that specifically relate to space activities. However, there are several general cybersecurity rules that apply to companies active in the space sector and to some products used in space applications.

The NIS 2 Directive (Directive (EU) 2022/2555) aims to achieve a high level of cybersecurity across the EU. It does not apply directly but must be implemented into national law by the member states. The NIS 2 Directive assigns entities to different categories of importance; the more important or critical the entity, the more obligations must be met.

Another relevant cybersecurity regulation at EU level is the Cyber Resilience Act (CRA). It affects entities that bring products or software with a digital component to the EU market. The products must then undergo a conformity assessment. The higher the risk category of the product the higher are the requirements that must be met.

In Germany, cybersecurity is primarily regulated in the Act on the Federal Office for Information Security (BSiG). In addition, the Federal Office for Information Security (BSI) has published guidelines on cybersecurity to minimise the risk of non-compliance with IT regulations. Published BSI Standards include requirements and recommendations for securing company data and sys-

tems, as well as a guide for implementing high IT security and data protection standards. Information security is thus, in general, achieved through a combination of the BSI Standards for establishing an information security management system and the implementation of the IT basic protection modules from the *IT-Grundschutz Kompendium*. These basic protection modules form the basis for the international ISO 27001 certification. The standard outlines the requirements for assessing and treating information security risks; addressing controls related to the security of data; and ensuring the confidentiality, integrity, and availability of information. Organisations certified under ISO 27001 demonstrate their commitment to robust information security practices and regulatory compliance.

3.2 Principles of Non-interference and Prevention of Harmful Interference

Since Germany has no general space law yet, “non-interference” and “harmful interference” are dealt with on the basis of the OST, other applicable international law and on the basis of various sector-specific laws, in particular the TKG as discussed in 2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots.

Germany provides for a space objects register as part of the general aircraft register (*Luftfahrzeugrolle der Bundesrepublik Deutschland – Band R: Raumfahrzeuge*), which is administrated by the German Aviation Authority (*Luftfahrtbundesamt*, LBA). Commercial space operators can, but are not obliged to, register their objects with the LBA or to disclose any information with respect to their space objects.

Further, Germany, as a member of both the EU and the ESA, is engaged in various EU and ESA measures, including those pertaining to:

- the ESA Zero Debris Charter (zero debris initiative); and
- ESA Clearspace-1 (removal of space debris).

Space situational awareness (SSA) and space traffic management (STM) are currently the focus of German and European discussions. German space operators participate in SSA initiatives to monitor space objects, including sharing orbital data and informing on and issuing collision avoidance manoeuvres. Germany also coordinates with international partners in the realm of STM.

3.3 Operators' Responsibilities

Due to the lack of a specific German space law, space operators' duties and obligations are based on general laws and the principles foreseen in international treaties and multinational agreements if and to the extent applicable in Germany.

ESG

Germany has no Space specific ESG guidelines (yet). The overall German ESG landscape, however, applies to space activities, introducing ESG guidelines and environmental obligations.

German environmental laws generally apply regarding the impact of any kind of activities on Earth. In particular the German Emission Control Act (*Bundesimmissionsschutzverordnung*, BImSchV) and other general legislation applies regarding launches, re-entry and in general regarding the environmental impact of the activities.

German entities are, to differing degrees and depending on their size and legal form, expected (but not legally bound) to follow guidelines under the general Corporate Governance Standards (*Deutscher Corporate Governance Kodex*, CGK).

This includes in a wider sense also transparency and conduct.

German national industry initiatives aim to foster environmental goals, in particular the German Space Strategy commitments to sustainability and responsibility, various specific industry initiatives and (for instance) the (self-commitment) of the DLR regarding sustainable behaviour.

Space Debris and Areas of Special Interest

There is no binding space-specific national regulation regarding environmental impact. However, besides the aforementioned principles, German entities are expected (but not bound) to follow best practice by adhering to ISO Standards (ISO 24113 – Space Debris Mitigation Systems).

There is no specific law regarding areas of special interest. Protection is provided by participation in international treaties and multinational agreements such as the OST and the Artemis Accords.

Intellectual Property and Space

There are no specific intellectual property rules targeting Space as such in Germany. As a rule, the general German and EU IP protection laws apply also to all space activities; however, their application and enforcement regarding certain space-related question is difficult and not yet fully clarified.

Outer space, including celestial bodies such as the Moon and Mars, is considered a domain beyond national appropriation as per the OST. This means that no country can claim sovereignty over outer space or celestial bodies, leading to the question of the extrajudicial nature of IP rights in space.

Given the challenges of enforcing IP rights in space, many space-related projects use contractual agreements to manage IP. These agreements can specify ownership, usage rights, and dispute resolution mechanisms for IP created or used in space activities between the parties. They are not capable, however, of establishing objective rights. Nonetheless, organisations such as the ESA work within frameworks that respect the IP laws of participating countries. In practice, IP protection for space activities is typically managed through a combination of national/regional IP registrations, international treaties, and contractual agreements among collaborating entities.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

In Germany, there are currently no national space-specific regulations dealing with property rights in outer space or with respect to extraterrestrial resources. Any obligations and rights in that regard are only discussed on the basis of the ratified international law, in particular the OST and the Artemis Accords.

Germany has, in the process of signing the Artemis Accords, confirmed that it will follow international law but has not further clarified its position beyond this.

4.2 Granting of Rights to Space Resources

There is no granting authority for resource rights in outer space in Germany and no national law concerning space resources.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

Germany has currently no space-specific framework for sustainability. The German Space Strategy, however, outlines commitments to responsible exploration and adherence to international guidelines, ensuring spacecraft design and operations consider environmental impacts.

Germany has not defined any protected zones in outer space, although it follows the international treaties and is a party to the Artemis Accords.

There are no government or legislative initiatives regarding critical space minerals. In recent years, however, the EU and Germany have shown interest in critical space minerals. In particular, the EU Space Strategy highlights the importance of securing access to critical raw materials.

At the national level, Germany has been actively involved in discussions regarding space mineral exploitation and has conducted research on potential lunar resource utilisation.

5.2 Climate Change and Space Activities

Climate Change and Space

The main current national initiative addressing climate change in relation to space activities is the German Space Strategy (2023). The German Space Strategy highlights the importance of space activities for the monitoring of the effects of climate change and the implementation of suitable counter measures.

Germany aims to be a leading location for the development and execution of innovative earth monitoring. In particular, the German Space Strategy describes the importance of space activities for questions of climate change as one

of the main fields of action for Germany, describing the monitoring and emission measurement in co-operation with the UN Environmental Programme (UNEP) and the on-going support of the COPERNICUS programme as key projects.

Sustainable Development Initiatives and Space

The German Space Strategy emphasises sustainable space exploration and the responsible use of space resources. Initiatives focus on reducing the environmental impact of space activities, promoting co-operation, and supporting research into related space technologies, in particular through earth monitoring.

Moreover, both the EU and Germany are actively involved in international collaborations addressing sustainability in space. Efforts include participation in UNEP and adherence to international guidelines for space debris mitigation and environmental protection.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

There are no specific tax regulations for space activities. Therefore, the general rules apply.

The jurisdiction of German law does not extend outer space. It remains unclear at the margins, however, where outer space begins. In this respect, both the so-called “Kármán line” at a height of approximately 100-110 km as well as the flight altitude achievable with conventional aircraft could be used as a basis. However, there are no international agreements or conventions in place which would bind Germany on this point. Apparently, neither the courts nor the tax authorities have yet commented on this demarcation question.

Therefore, deliveries (for example of a satellite) or other services in space are generally not subject to German VAT, while sales in German airspace may be.

For income tax purposes, according to general rules, all income earned is subject to German (corporate) income taxation. For an Individual, this is the case if it has its place of residence or habitual residence in Germany. For a company, this is the case if it has its management or its registered office in Germany. Income that was not earned in Germany is also considered and includes income earned in outer space (for details see 6.3 Taxation on Sale or Transfer of Space Assets).

Provided that a Double Taxation Agreement (DTA) modelled on the OECD Model Tax Convention applies, companies that have their management in a foreign treaty state are generally exempt from German (corporate) income taxation. This should also not be different to the extent any flight vehicles transit German airspace. The LuftVG qualifies spacecraft, rockets and similar missiles as aircrafts as long as they are in airspace. This also includes unmanned aerial vehicles, including their control stations, which are not operated for the purposes of sport or leisure activities. Therefore, all of these vehicles should also qualify as aircraft for the purpose of an applicable DTA.

6.2 Tax Incentives for Space Investors

There are no space-specific tax incentives for investors in Germany. However, taxpayers are entitled to claim the research allowance (*Forschungszulage*) pursuant to the Research Allowance Act (FZulG), to the extent that they are not exempt from taxation.

Eligibility requires the realisation of a favoured research and development project. R&D projects are eligible if they fall into one or more of the categories of basic research, industrial research or experimental development.

The amount of the research allowance is based on the eligible expenditure and equals (currently) 25–35% of the eligible expense. The eligible expenses for R&D projects carried out in-house include the gross wages for employees, insofar as they are employed in a subsidised R&D project, as well as eligible own expenses.

The research allowance applies to an assessment basis of up to EUR15 million. If an R&D project is carried out as contract research by a third party, up to 70% of the agreed remuneration may qualify as eligible expenditure.

6.3 Taxation on Sale or Transfer of Space Assets

The sale or transfer of space assets is generally subject to VAT at a rate of 19%. In principle, a company can deduct the VAT charged on inputs from the VAT payable on outputs. However, as mentioned in 6.1 **Tax System for Space Activities**, the sale and transfer of assets may be outside the scope of German VAT if carried out in outer space.

All profits realised by a German company are also subject to German corporate income tax at the rate of 15.83% (corporate income tax of 15% plus 5.5% solidarity surcharge thereon). Additionally, trade tax may apply at a rate of approximately 9% to 20%, depending on which municipality levies the tax. Again, this is dependent on the sale and transfer being deemed to have been carried out outside of German airspace, a clear definition of which does not exist yet.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace” NewSpace

In the past few years, the German NewSpace sector has developed a diverse landscape that extends beyond the production of launchers and satellites.

According to a study conducted in 2020, the 92 dedicated NewSpace companies then in existence had more than 2,900 employees between them and, as early as 2018, estimated aggregate revenue of EUR873 million. The number of start-ups in the space sector (or adjacent deep tech sectors with ties to space) has significantly risen since then and is currently estimated to be above 1,000. Most of them are clustered around the renowned German technical universities.

There are several initiatives underway in Germany aiming to connect the activities of established companies, medium-sized providers, start-ups and State institutions together. Start-up hubs set up at universities and the various existing programmes and activities of the DLR, ESA and other agencies support the rapid growth of the German start-up scene.

Established German space economy players continue to have their internationally recognised technological focus primarily on the development and manufacture of systems and components as well as the provision of satellite services. However, companies that develop new technologies and offer logistics services, including micro-launchers for small satellites, an entirely new generation of satellites and related components, as well as a variety of new solutions for collecting and transmitting data in

and from space and analysing such data, are increasingly coming to the fore.

VC and Fundraising

Since 2018, German space tech business start-ups have witnessed a notable spike in equity investments through venture capital, angel, and corporate investors. According to the study referenced above, the cumulative VC investment amount for the top deals in 2020 totalled EUR308 million. Financial backers active in the German NewSpace sector include top-tier funds and smaller VCs, corporate venture capitalists, and angel investors.

VC and family office backing is the most important third-party liquidity source for German space start-ups. Due to the technological quality of German technical universities and the technological level of start-ups around these universities, there is a steady and – against the overall trend – good level of interest from VC funds in German space start-ups. Financing rounds for German space startups made up two of the three highest valuations in EU in 2023.

(Alleged) challenges often criticised by VC investors regarding the German VC landscape and possibly hindering a better “ranking” for VC interest in Europe include the lack of dedicated national space legislation (leading to uncertainties), the relative complexity of general compliance and the lack of clear goals of the German Space Strategy.

7.2 Finance Sources for Space Activities

Space activities in Germany are publicly as well as privately funded.

The German State supports the space industry through several initiatives, for instance, the NPWI. Funding through the NPWI is available

for companies, universities, and non-university research institutions. In addition, the state supports space enterprises via the DLR Project Management Agency. In 2023, the DLR Project Management Agency administrated a funding volume of around EUR2 billion, for more than 14,500 funding projects.

Space businesses in Germany are also privately funded. The total sum of equity investments in German NewSpace companies from 2019 to 2021 amounted to EUR881 million. Most of the private investments comes from VC funding (including angel investments) and from family offices. Private investors in Germany are mostly overall tech investors or specialised air, space and defence investors, with a rising tendency of sector-agnostic investors participating.

An alternative way of financing, often discussed, could be the use of crypto-assets. Usage cases could be:

- as security (instead of usual shares) – this creates the possibility of crowdfunding for seed stages, allowing worldwide participation and tapping into a new and wider source of investors;
- for digitised assets such as tangible fixed assets/products, IP or parts of any such assets or future outcomes; and
- for digital assets as such (stable coins, asset backed tokens, cryptocurrency) – this could tap into the interest of enthusiastic supporters as well as into professional or institutional investors.

7.3 Attracting Investment for Space Activities

Technological quality, industry experience, a strong and well-educated workforce as well as political stability and a perceived attractive

German and EU market are assets that attract investment in space activities in Germany.

The investment in space activities is seen as part of the deep tech investment landscape, with a view to being part of advanced technological enterprises with potentially multiple profit effects. Macro effects such as the current discussion around security autonomy, the obvious importance of space data for climate change, and the apparent race to return to the Moon provide additional confidence that the space sector will develop sustainably and that interest is not just hype.

7.4 Foreign Investment in Space Activities

In Germany, foreign investments in domestic companies are regulated by the state under the Foreign Trade and Payments Act (AWG) and the Foreign Trade and Payments Regulation (AWV). The Federal Ministry for Economic Affairs and Climate Action (BMWK) is empowered to scrutinise acquisitions and investments by foreign entities. There are two primary methods of screening: cross-sectoral and sector-specific.

Cross-sectoral screening applies to acquisitions and investments in German companies by non-EU investors, regardless of the industry sectors involved. This screening has thresholds set at 10% and 20% for particularly security-sensitive areas and 25% for other areas in terms of controlled voting rights. Although not all foreign investments undergo automatic scrutiny, there is a mandatory reporting requirement for areas such as satellite operations and companies engaged in aerospace goods or technologies. A specific approval by the BMWK is required in these cases.

Sector-specific screening targets companies involved in military technology manufacturing, sales, or usage. It also includes investments from EU member states exceeding a 10% voting rights threshold. Transactions may be restricted or prohibited if they threaten Germany's essential security interests. For instance, in December 2020, the BMWK blocked the acquisition of German firm IMST GmbH by the China Aerospace Science and Industry Corporation. The BMWK cited concerns over losing technological sovereignty, noting IMST's 25-year involvement in commercial radio technology as a factor in its decision.

7.5 Role of Securities Markets in Space Financing

Most small and medium-sized companies in the NewSpace sector are not listed on the stock exchanges in Germany.

The forgoing is also true for debt security market instruments such as bonds. This appears to be an omission since the ability to provide for a listed investment may open the door for investors that are obliged to invest in listed securities.

In addition, further pursuit of, for instance, the Cape Town Protocol on Space Assets or similar initiatives with the aim of allowing a standard of collateral for space assets to establish itself or the development of the tokenisation market for space assets (see 7.2 Finance Sources for Space Activities) could add a further way of structuring third-party financing.

Trends and Developments

Contributed by:

Andreas Lenz and Thomas Jansen

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Introduction

What can be expected in terms of future trends from a field often in itself seen as mere science fiction? The view that the space sector represents science but without the fiction is reinforced by the involvement in the search for future space developments by serious, leading EU politicians such as Thierry Breton and Ursula von der Leyen, as well as by the involvement of organisations such as the European Space Agency (ESA) and other renowned institutions. With many governments developing strategies and publishing roadmaps to open space for the EU and Europe or just for their respective state, this article outlines the anticipated near-future trends in the space sector.

Continuation of Macro Factors

The most notable development in the space sector in the past decade has been the arrival of private stakeholders and the emergence of the “NewSpace” economy. This economy is, as of yet, significantly driven by so-called “downstream” technologies, consisting of data obtained in space and to be analysed and utilised for matters on earth. Space-data utilisation, as well as businesses enabled by this, is to be expected to grow further with the number of space objects obtaining data and with increasing capabilities to actually analyse and utilise this

data for business in the wider field of digitalisation.

The primary reasons for states and institutions to continue investing substantial funds into the space sector and of the private sector to see more and more of a future market in space are not just the advancements in technology but also the following macro factors.

- Strategic security needs – the growing necessity for space-enabled capabilities for observation and action, especially during times of increasing global tensions.
- Environmental monitoring – the crucial role of space technology in tracking environmental changes and climate change impacts.
- Digitalisation and data services – the reliance on space technology for implementing digital and data-based services and business applications.
- Competitive space race – the international competition to secure advantageous positions in space and on the Moon.

These macro factors foster ongoing finance from states and institutions and as a result, new ideas and business models, attracting increasing interest from private stakeholders, despite the sector’s current lack of economic self-sustaina-

bility in many areas. Consequently, profit-driven investors can expect at least some sustainable government and institutional demand.

Additional reasons to focus on space include technological advancements and economic opportunities, particularly in the fields of agritech, foodtech, health, tourism, material science, energy, and data processing. Many programmes, on both a national and international level (for instance ESA BSGN and EU Cassini) pursue the development of initiatives in these areas for a variety of reasons. While none of these areas is yet a stand-alone prime driver, each contributes to funding and interest as space-enabled technologies and by providing for market demand in many other space-related areas. This situation may evolve as space infrastructure expands beyond current levels and in-space production and re-entry technologies become more accessible. These areas, furthered extensively by various ESA and EU programmes are worth watching, given the ongoing successful initiatives at both national (German) and international level.

Technology Trends

Data and satellites will become even more central to the development and interests of both the public sector and private stakeholders. All of the previously defined macro factors rely heavily on these technologies. The sheer number of planned space objects in low earth orbit (LEO) connected with these macro trends is astonishing and will accelerate the following technology trends.

- Satellite, sensor, and communication technology – increased focus on the development and production of these technologies.

- Launching technology – particularly for LEO, but also for medium earth orbit (MEO), geostationary orbit (GEO), and beyond.
- Re-entry and re-usage technology – essential for sustainability and space debris management.
- Ground station infrastructure – critical for communication and sensor data to make use of the many space objects.
- Resilience technology – ensuring the durability and reliability of space systems.
- Space services and infrastructure – including water, fuel, repair, and staff transport.
- Space debris avoidance and space situational awareness (SSA)/space traffic management (STM) technology – a major focus for politics, legislation, and financing.

It is clear why the steady development of satellite, sensor, and communication technologies will remain a focus in light of these macro factors.

The numerous planned space objects will require many more launching systems and launches than are currently available. It can be expected that the number of capable launching systems (in particular for LEO) will increase significantly until the end of 2027. More than ten individual launching companies in Europe alone will take their first test flights in 2024, in addition to Ariane 6 and Vega becoming “functional”. In the US, several heavy-lift vehicles have recently completed successful tests, with many more test launches from small launching companies expected by the end of 2025. India, Japan, and China, to just name a few, are also continuously testing, with over 30 individual launch companies. Overall, the number of LEO-capable launching systems is expected to increase significantly, with over 300 LEO launches per year anticipated by 2027. This would more than triple

the world's current satellite deployment capabilities, considering the capabilities of the heavy lifters in the United States and Ariane 6 in other parts of the world.

This progress depends on the simultaneous acceleration of the development of ground stations, launching ports, communications facilities, and sensor technology. Both Germany and the EU/ESA have intensified their facilitation efforts significantly in recent months, as private financing interest has increased. Development and financing are therefore expected to grow in relation to the launcher technology.

Given that space debris avoidance and sustainability are already important items on the agenda of most spacefaring nations and institutions, the importance of reliable re-entry and re-usage technology will naturally increase. The latter is, again, a focus area at least in Europe, as a recent speech by, for instance, Thierry Breton indicates. In addition, due to a combination of sustainability and safety targets and the increase of space objects, it is likely that technology in the areas of space services and space infrastructure will make a meaningful entry into the market. The aim will be to provide – for instance – refuelling, repair and similar services, extending the lifetime of space objects.

Further but already visible areas of technological development are moon landing technology and (although their actual application in space is still a little further into the future) in-situ resource utilisation technologies. The application of space technologies in agritech, foodtech, health and life sciences, energy production, as well as large-scale pharmaceutical, seed, or smart material production in space seems increasingly close. Experiments in space and on the International Space Station (ISS) have been ongoing for

years, and a small economy around micro-labs and transfers to the ISS already exists within an economic niche environment.

Consolidation

The availability of technologies such as satellites and launch systems, which are currently in short supply, is expected to increase significantly in the coming years, particularly from 2027 onwards, due to the growing number of companies involved in development and production.

Disruptive effects are already evident in the market for MEO and GEO satellites, which face significant competition from LEO satellites and new data communication capabilities.

It is also anticipated that not all of the companies currently developing and testing launch systems will survive the efficiency-driven pricing pressures. Furthermore, some will face significant competition from companies supported by government security, defence, and dual-use contracts. Therefore, consolidation of the market is likely, possibly even before demand matches the capabilities in satellites, communication, and launch systems.

Space Debris and Space Safety

As previously discussed, space debris is a major focus in space politics, legislation, and funding, both private and public. The demand for launching satellites and other space objects is expected to surge, potentially more than doubling the number of functional satellites in the next three to five years. This increase will exponentially raise the risk of new space debris, adding to the approximately 30,000 existing objects of significant size. Consequently, the importance of preventing new debris and managing existing debris has been recognised at the German and EU/ESA levels.

Two main strategies are expected to address this issue: one for managing the debris that already exists and one to limit the quantity of future debris.

Managing existing space debris

The focus will be on monitoring, STM, and SSA technologies. The challenges are not only technological but also political and legislative. Both the EU and ESA have acknowledged the need for a co-ordinated approach, involving the facilitation and procurement of necessary technology and data sharing (“Space Data Space”). As part of the upcoming European Space Law (EUSL), expected by 2025, adequate legislation will be developed and implemented over the next three years. Harmonisation and enforcement of these laws as well as finding the right balance with the aim of not overburdening the developing space economy will be the most challenging aspects.

Preventing future space debris

The focus will also be on technology and legislation. Re-entry and safety-by-design technologies will be accelerated. For example, designing space objects to allow for in-orbit refuelling or repair, with the first service providers hopefully becoming functional by 2027. The challenges here also lie in politics and legislation. Establishing standards for permits for space activities, allocating orbits and frequencies, and setting requirements for financing and insurance will be critical. Harmonising these laws and ensuring their enforcement will be complex.

Legislative approaches will aim to bind not only EU and ESA member state stakeholders but also any company offering services within or to stakeholders in the EU and ESA Europe.

Resilience and Sustainability

In addition to space safety (ie, anti-debris measures), resilience and sustainability remain core pillars of the EUSL and are expected to be addressed when the law is passed in 2025.

Resilience requirements in both digital and non-digital sectors are influenced by the NIS-2 and CER directives, which are yet to be implemented into German law and from similar legislation specifically aimed at space. It would be surprising if the expected EUSL draft does not use similar mechanisms as a basis for resilience goals in the space sector.

Furthermore, sustainability in space aligns with the broader European Green Deal. Companies in the space industry are already subject to general EU sustainability regulations. However, the data on the environmental impact of space activities on Earth is still insufficiently researched in some areas, making it difficult to implement specific measures by binding regulation.

One of the most challenging questions surrounding resilience and sustainability is how these can be achieved within the EU’s existing powers in the space realm. The approach will likely differ for resilience on the one hand and sustainability on the other. Without delving into the details of Article 198 of the Treaty on the Functioning of the European Union (TFEU), harmonisation regarding resilience seems necessary and unavoidable. However, harmonisation is specifically excluded by Article 189, paragraph 2 of the TFEU, and Article 4, paragraph 3 of the TFEU. Nevertheless, EU competencies, including for space, may arise, as it is argued by some, from Article 114 (in conjunction with Article 26) of the TFEU, which obliges the establishment and maintenance of the EU’s internal market.

Conversely, the – as of yet – current lack of comprehensive data on the effects of space activities both on Earth and in space challenges the necessity and suitability of detailed, binding regulations for various sub-areas (eg, standards for the entire value chain, effects of re-entry on the atmosphere or maritime regions, standards for rocket engines and manufacturing materials). Therefore, it is expected that the approach to sustainability legislation will be more flexible, possibly staggered and build on soft law (eg, EU labelling for best practices). We expect that for the next three years, soft law will likely form at least a part of any legislative initiatives around sustainability issues as they relate to space.

EU Space Law and Europe's Changing Approach

Significant new legislation, some of it groundbreaking, is expected to be introduced in the near future.

In Germany, a first German Space Law is awaited, and allegedly being worked on, without (as of June 2024) a timing being given.

At the EU level, the publication of and subsequent vote on the long-awaited draft EUSL is expected in 2025. The major challenges will involve harmonising safety and resilience issues and ensuring adequate economic protection measures for private space stakeholders, particularly SMEs. While it appears to be very likely that resilience measures (comparable to the NIS-2 and CER directives) will be proposed to be implemented as binding directives, the issues surrounding safety and the necessary measures are more complex. Safety requirements should also be binding; however, these necessitate a comprehensive plan that includes STM and SSA measures, which will only be fully effective if accepted internationally. Therefore, certain

safety principles will be codified in binding law, while it may be the case that other aspects may be governed by guidance and soft law for a certain period. The sustainability provisions of the EUSL may primarily be regulated by soft law in the near term. Additionally, it is expected and even promised that adequate economic protection measures will be implemented to safeguard the space economy, particularly for SMEs.

From an international perspective, the EUSL will likely protect the EU space sector and apply to all enterprises providing services within the EU, not just EU stakeholders.

Countries with existing national space laws will need to reassess and possibly amend their legislation in light of the EUSL. Countries that, like Germany, do not have a national space law by mid-2025, should aim to develop a plan for national legislation before the EUSL discussions begin, to be a meaningful part of the discussion.

In summary, beyond the general questions of necessity and proportionality, any European-level legislation will be evaluated by stakeholders based on the following criteria.

- Avoidance of additional costs and bureaucratic burdens, focusing on balanced policies that protect a developing economy and foster innovative technology rather than inflexible micro-management.
- Support, incentivisation, and alternative policy forms to allow room for flexible technological development.
- Serious economic cushioning of additional burdens arising indirectly along the entire value chain at all affected levels.
- Gradual implementation of binding regulations, allowing time for necessary clarification

of facts in some areas and for technological progress.

- Size thresholds for those affected, to protect regulation-sensitive SMEs, start-ups, and scale-ups.
- Extension to services from third countries to compensate for any competitive disadvantages within the EU.

Overall Politics/ESA Geo-Return

At the national level, Germany is expected to introduce its first national space law, aligning with the space laws of other countries within the next few years. This law will likely address:

- registration and conditions for space activities;
- liability, recourse, and limitation of liability for damages and insurance requirements;
- safety aspects;
- data, cybersecurity, and resilience aspects;
- environmental protection and sustainability requirements;
- ownership and registration of space objects;
- IP protection for inventions or know-how acquired in space;
- foreign investments, export control, and sanctions regulations;
- ownership and utilisation rights to materials and space bodies, including related extraction and transfer rights;
- law enforcement; and
- alignment with general German and EU laws.

Due to the major factors outlined above, the draft EUSL and any other international treaty or binding space law will be of strategic significance, not only for industrial policy but also for security autonomy. All affected countries will consider the EUSL from the perspective of maintaining their own national capabilities.

While maintaining national capabilities is understandable and necessary, it may conflict with the need to join forces at least on an EU level, leading to targeted allocation of funds to specific projects and providers. This has already sparked a new (and this time possibly serious) discussion on the “ESA Geo-Return” principle. Some view this Geo-Return as a restriction on space ambitions and of efficiency, while others see it as a guarantee that the existing provider situation will not be cemented at the expense of SMEs and new players. Whatever the outcome, the Geo-Return principle will face serious scrutiny from 2025 onwards, possibly requiring the EU and ESA to negotiate a new deal on project and fund allocation among member countries, and hereby modifying the current application of Geo-Return.

The Economic Environment and Other Factors

An increase in available funds, grants, and subsidies at both the national and European levels (Germany, ESA and EU) is forecast. This expectation is based on the continuing macro factors and trends outlined above. Public funding will increasingly be used to sponsor private investors, alongside purely private investors, outside the scope of European or national investment banks.

A significant concern for both SMEs and investors is insurance. The market has experienced several challenging years, with major players exiting the business and rising prices. Given the technical complexity and innovative nature of many assets requiring insurance, reluctance to provide comprehensive coverage for very new technologies is understandable. However, innovation and investment are hindered if insurance is unavailable. This issue is currently being discussed among stakeholders in the wider

insurance industry and at the ESA/EU level. A consultation regarding the need for insurance as a pre-condition for space activities has already taken place in the UK.

Several ideas are being considered, including the following.

- A centralised historical database or due diligence system to avoid overlap and additional costs in syndicated insurance arrangements. However, significant changes are not expected, even if insurers or brokers prove to be open to this idea.
- Implementation of a sidecar structure funded by ESA, EU, or national institutions. This would allow insurance providers to offload part of the risk without transferring equivalent insurance fees.

The latter proposal would not only affect insurance costs. While insurance costs may not hinder insurable projects, institutional players financing a project could facilitate its execution by assuming a significant share of the insurance risk, like assuming financing risk. This could also be tied to a “best practice” commitment from space stakeholders, ensuring that only projects adhering to these practices would be eligible to use this sidecar arrangement.

Regardless of the solution, there is a need for outside measures to maintain sufficient “appetite” for complex new technologies in the insurance market.

Summary

In summary, the following major trends are expected to continue at least until 2027:

- downstream services as biggest area of private investment;
- continuation of major factors, particularly security and strategic space capabilities;
- stronger connection and importance of dual-use projects and technology;
- significant development in technology related to satellites, data, and launchers (and all supporting technology);
- focus on safety and resilience in line with EU and national institutional goals;
- introduction of EU Space Law and German Space Law;
- greater alignment of EU politics, ESA strategy, and national strategies, with a particular discussion of the current ESA Geo-Return mechanism; and
- review and enhancement of the current insurance structure with additional mechanisms.

INDIA

Law and Practice

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Contents

1. Global Trends p.68

1.1 The “NewSpace” and Space Tech Economy p.68

2. Existing Legal and Regulatory Framework p.68

2.1 Characteristics of the Space Industry p.68

2.2 Legal System and Sources of Space Law and Regulation p.69

2.3 Role of the State in Space Law and Regulations p.71

2.4 Role of the State in the Licensing Process for Space Activities p.72

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.72

2.6 Role of the State in the Launching Process p.73

2.7 Commitment to International Treaties and Multilateral Discussions p.73

2.8 Insurance and State Measures on Liability for Damages p.74

3. Rules Applicable to Space Operators’ Activities p.75

3.1 General Rules on Space Activities p.75

3.2 Principles of Non-interference and Prevention of Harmful Interference p.77

3.3 Operators’ Responsibilities p.77

4. Ownership of Extraterrestrial Resources p.78

4.1 Nature of Space Resource Rights p.78

4.2 Granting of Rights to Space Resources p.78

5. Environmental Protection and Impact on Climate Change p.79

5.1 Environmental Protection in Space p.79

5.2 Climate Change and Space Activities p.79

6. Taxation of Space Activities p.80

6.1 Tax System for Space Activities p.80

6.2 Tax Incentives for Space Investors p.81

6.3 Taxation on Sale or Transfer of Space Assets p.81

7. Investment and Financing in Space Activities p.82

7.1 Impact of “NewSpace” p.82

7.2 Finance Sources for Space Activities p.83

7.3 Attracting Investment for Space Activities p.83

7.4 Foreign Investment in Space Activities p.84

7.5 Role of Securities Markets in Space Financing p.84

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

The current size of the Indian space economy is estimated at around USD8.4 billion, with a compound annual growth rate of 4%. The size of the sector is expected to reach USD13 billion by 2025, and India aims to capture approximately 9% of the global economy by 2030 and boost the value of the industry to at least USD40 billion by 2040.

India has been at the forefront of international developments in space law and has a well-recognised global profile. It is a signatory to various international treaties including 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 (“Outer Space Treaty”); the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968 (“Rescue Agreement”); Convention on International Liability for Damage Caused by Space Objects 1972 (“Liability Convention”); the Convention on Registration of Objects Launched into Outer Space (“Registration Convention”); the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies 1979 (“Moon Agreement”) (although not ratified); and the Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes 2020 (“Artemis Accords”), evidencing its conscious efforts towards international co-operation and liability (“India-International Treaties”) (further detailed in **2.7 Commitment to International Treaties and Multilateral Discussions**).

At the domestic level, India did not have a legislative framework governing the space sector for

the first five decades of its space programme. However, the last couple of years have seen accelerated regulatory reforms including the release of the Indian Space Policy 2023 and its operational guidelines, and the establishment of a sectoral regulator (detailed in **2.2 Legal System and Sources of Space Law and Regulation** and **2.3 Role of the State in Space Law and Regulations**). The release of the Indian Space Policy 2023 marks a critical moment in India’s space journey and is in line with the Indian government’s objectives towards becoming a global leader in the space sector.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The Indian space programme began in the 1960s, and since its inception, India has revolutionised the space sector by developing indigenous capabilities and has become one of the leading space-faring nations. For the first five decades since the space programme’s inception, the Indian space industry was predominantly regulated and operated by its national space agency, the Indian Space Research Organisation (ISRO), which functions under the Department of Space (DOS) of the government in India. Initially, ISRO began in 1962, as the Indian National Committee for Space Research (INCOSPAR); however, in 1969, INCOSPAR was subsumed within the Department of Atomic Energy and was renamed ISRO.

In the last few years, the Indian space ecosystem has shifted gears with the establishment of the Indian National Space Promotion and Authorisation Centre (IN-SPACe) in 2020 and NewSpace India Limited (NSIL) in 2019, which are centres under DOS, acting as the drivers of

commercial growth to encourage private sector participation in space activities. IN-SPACe is a single-window, independent nodal agency that functions as an autonomous agency in DOS and acts as an interface between ISRO and non-governmental entities. The Indian Space Association (ISpA), a voluntary industry association for Indian space and satellite companies, facilitates collaboration between the different stakeholders in the industry for accelerating the growth of the private sector.

Historically, India has been a protected economy, and investments from non-residents are subject to restrictions and conditions that are dependent on the sector and activities purported to be undertaken in India. Recently, India has liberalised its Foreign Direct Investment (FDI) norms in a move to attract foreign investments in the space sector and has now permitted foreign investments in Indian entities engaged in this sector subject to certain limitations that have been created based on subclassification of the activities undertaken by those entities. More details of the amendments to the FDI regime in India are detailed in **7.4 Foreign Investment in Space Activities**. Further, there are several government initiatives taking place in the space sector on the internationalisation front including collaborations on space missions with international agencies, such as NASA and the European Space Agency, and the recent signing of the Artemis Accords agreement.

Such developments align with the global trends of privatisation and internationalisation, and position India as an “*Aatmanirbhar*” (self-reliant) nation in space, in line with the Indian government’s “Make in India” initiative.

2.2 Legal System and Sources of Space Law and Regulation

The Indian legal system has elements of civil law, common law, equitable law, and customary and religious laws. The primary domestic sources of law include the Constitution of India, which is the supreme source of law, statutes enacted by Parliament or the state legislatures, local customs or conventions, and judicial decisions of courts holding precedential value.

In terms of the space sector, while India does not have an overarching space law that is currently effective and there exists limited jurisprudence in case law, there are other laws, policies and drafts of bills that attempt to regulate different aspects of the sector. Further, given the dynamic nature of the space sector, there are certain overlaps that exist with other sectors such as the telecommunications sector.

The following set of laws forms the governing framework for activities in the space sector. Note that some of these are drafts of legislations that are yet to be adopted as laws and are not effective at time of writing.

- *Indian Space Policy 2023 (“ISP 2023”) read with the Norms, Guidelines and Procedures for Implementation of ISP 2023 in respect of Authorisation of Space Activities 2024 (“NGP 2024”)*: ISP 2023 outlines the vision, objectives and strategies of the Indian space programme and defines the roles and responsibilities of the different stakeholders in the Indian space ecosystem including non-government entities (NGEs), ISRO, IN-SPACe, NSIL, DOS, etc. NGP 2024 sets out the authorisation regime for space activities including space-based communication, establishment and operation of remote sensing and amateur satellite systems, access to

available Indian orbital resources, dissemination of space-based earth observation/remote sensing data, operation of space transportation systems, establishment and operation of ground systems, liability-related aspects and registration of space objects. NGP 2024 also sets out the compliance regime, consent and intimation requirements, and conditions of authorisation that Indian entities engaged in space activities are required to comply with.

- *Satellite Communication Policy 1997* (“*Sat-Com Policy 1997*”) read with the *Norms, Guidelines and Procedures for Implementation 2000* (“*NGP 2000*”): Prior to ISP 2023, SatCom Policy 1997 was the only existing legislation governing the establishment and operation of satellite systems, satellite communication and launch vehicles, etc. It provided for the Indian National Satellite System (INSAT) to be leased to NGEs and for foreign satellites to operate from the Indian territory under special circumstances; NGP 2000 set out the regime on use of INSAT by NGEs, issuance of licences and use of foreign and domestic satellites. Currently, NGP 2024 sets out the authorisation regime for space-based communication.
- *Telecommunications Act 2023*: Governs the assignment of satellite spectrum in India. Earlier, allocation of satellite spectrum was done through auction conducted by the central government. However, under the Telecommunications Act 2023, assignment of spectrum for space research and application, launch vehicle operations, ground station for satellite control and certain satellite-based services are required to be undertaken through an administrative process.
- *ISRO Act 1969*: The first legislation governing space activities in India. It provided for the establishment of ISRO, entrusting it with the responsibility of development of indigenous technology, launching of satellites and conducting space research.
- *Remote Sensing Data Policy 2011* (“*RSP 2011*”): Governs the acquisition, dissemination and distribution of remote sensing data collected from Indian and/or foreign remote sensing satellites in India and mandates licence/permission from the government, prior to undertaking such activities. NGP 2024 sets out detailed guidelines on authorisation for dissemination of space-based earth observation/remote sensing data.
- *National Geospatial Policy 2022*: Governs access to geospatial data and encourages open standards, open data and platforms, and enhances the role of the private sector in the creation, maintenance and monetisation of geospatial and mapping infrastructures, innovations, etc.
- *Draft Space Activities Bill 2017*: Proposes to regulate commercial space activities in India, this draft bill is the first comprehensive legislation on space law in India and provides for registration of space objects, and a framework for licensing, liability, insurance and intellectual property rights in relation to space activities.
- *Draft Space-based Remote Sensing Policy of India 2020*: Proposes to provide easier access to space-based remote sensing data and information and seeks to replace RSP 2011.
- *Draft SpaceCom Policy 2020*: Proposes to regulate the use of space-based communication technologies in India and seeks to replace SatCom Policy 1997.
- *Draft National Space Transportation Policy 2020*: Proposes to regulate independent launch activities, promote development of capability and capacity in space transportation systems, enable commercial utilisation

of launch capacity and space transportation technologies, etc.

- *Draft Humans in Space Policy for India 2021*: Proposes to regulate Indian human space-flight programmes.
- *Draft Indian Satellite Navigation Policy 2021*: Proposes to regulate satellite-based navigation in India including interface for dissemination of signal-in-space.
- *Draft Technology Transfer Guidelines 2020*: Proposes to regulate the transfer of technology between DOS and the space industry at large, and mandates NSIL with the role of commercialising technologies developed by DOS/ISRO.

Draft legislations are likely to be implemented in the next couple of years, and developments in upcoming sectors that have remained unregulated so far such as space data processing, space insurance, intellectual property rights in relation to space activities and assets, etc, are anticipated.

2.3 Role of the State in Space Law and Regulations

As set out in 2.1 **Characteristics of the Space Industry**, the space industry in India has predominantly been dominated by the government, acting through DOS – the nodal space department in India, primarily functioning under the supervision of the Prime Minister’s office in India. In 1962, INCOSPAR was set up, which was superseded by ISRO in 1969.

Over the years, the Indian space industry has functioned as a participant, as a regulator and, with the onset of NewSpace (as discussed in 7.1 **Impact of “NewSpace”**), as a facilitator for private entities. Currently, DOS functions through different centres and units which constitute the Indian space ecosystem, and we have set out

the roles and responsibilities of some of the key units of DOS below.

- *Space Commission*: DOS through the Space Commission formulates policies and supervises the implementation of the Indian space programme.
- *ISRO*: ISRO is the implementation/execution wing of DOS for the Indian space programme. It is India’s national space agency, responsible for executing Indian space programmes, and is at the forefront of space development in India. It has developed satellite launch vehicles such as PSLV and GSLV, and major space systems for communication, television broadcasting, space-based navigation, resources monitoring and management, etc. Currently, ISRO works with around 60 ministries and departments to promote space technology tools and application.
- *IN-SPACe*: Acts as the regulator for the granting of authorisations and permissions to private entities in the space sector. IN-SPACe acts as a single-window, independent and autonomous body, and facilitates the demands of private players by acting as an interface between ISRO and NGEs.
- *Antrix Corporation Limited (ACL)*: Acts as the marketing arm of ISRO, under the administrative control of DOS. ACL is wholly owned by the Government of India and provides space products and services including launch, consultancy and training services, globally.
- *NewSpace India Limited (NSIL)*: Acts as the commercial arm of ISRO, under the administrative control of DOS. NSIL is a wholly owned public sector undertaking by the Government of India and primarily facilitates transfer of technology between ISRO and other players in the Indian space industry. As the name itself suggests, NSIL was recently

incorporated in light of the liberalisation of the Indian space sector for private players.

In addition to the DOS units set out above, there exist several independent units that focus on research and development in space technology.

2.4 Role of the State in the Licensing Process for Space Activities

Under ISP 2023, IN-SPACe under the aegis of DOS acts as the regulator for space activities in India and the single-window agency for authorisations. NGP 2024 details the procedure for authorisation of such space activities.

Only Indian entities are permitted to apply to IN-SPACe for authorisation (except in certain instances where non-Indian entities can directly seek authorisation), and non-Indian entities desirous of conducting space activities in India can collaborate with an Indian entity in the form of an Indian subsidiary, joint venture, partnership, etc to seek authorisations.

The following space activities need authorisation from IN-SPACe:

- establishment and/or operations of space objects;
- operations of space transportation systems;
- planned re-entry of space objects with or without recovery;
- establishment and/or operation of ground systems;
- dissemination of space-based earth observation/remote sensing data; and
- sale/purchase/transfer of space objects in orbit.

Timelines: Any Indian entity seeking authorisation can apply on a dedicated portal for application to seek authorisation from IN-SPACe at

IN-SPACe Digital Platform (IDP). Upon receipt of complete application and inter-ministerial/departmental consultations, if required, IN-SPACe grants approval within a period of 75 to 120 days.

Information requirements/documentation: Further, the application form mandates varying levels of compliance and disclosure based on the proposed activity to be undertaken. However, every applicant is required to demonstrate financial and technical credentials, and operational, infrastructural and technical capabilities in relation to the activity proposed to be undertaken by the applicant. Additionally, applicants are required to disclose their net worth, significant beneficial owners (if any) and criminal records, and obtain security clearance (if sought by IN-SPACe).

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

In India, radio frequencies and spectrums are controlled by the central government, and the central government issues guidelines under the National Frequency Allocation Plan (NFAP) for the use of spectrum. The NFAP provides a broad regulatory framework, identifying which frequency bands are available for different services including cellular mobile service, Wi-Fi, sound and television broadcasting, radio navigation for aircraft and ships, defence and security communications, disaster relief and emergency communications, satellite communications and satellite broadcasting, etc.

The Wireless Planning & Coordination (WPC) wing of the Department of Telecommunications, Ministry of Communications, in India is the national radio regulatory nodal agency of the Government of India and represents India at the

International Telecommunication Union (ITU). It is responsible for planning, engineering, regulating, managing and monitoring the limited natural resources of radio frequency spectrum and satellite orbits. Further, the Wireless Monitoring Organisation functions as a field unit of WPC and undertakes spectrum management and co-ordination to avoid interference.

For satellite communications in particular, the SATCOM Monitoring Centre (SMC) Division (earlier known as the Network Operations and Control Centre), is responsible for control, monitoring and coordination of satellite communication services and satellite-based networks in India.

It is relevant to note that until the release of NGP 2024, private players were permitted to obtain orbital slots only from WPC. However, satellite players are now permitted to approach other international agencies to obtain frequency and orbital slots (as discussed in **3.1 General Rules on Space Activities**). Further, NGP 2024 imposes certain obligations upon operators to ensure non-interference (as discussed in **3.2 Principles of Non-interference and Prevention of Harmful Interference**).

2.6 Role of the State in the Launching Process

The Indian space sector has historically been controlled by the government. Accordingly, for the large part of India's space journey, ISRO, through its centres such as Satish Dhawan Space Centre, Vikram Sarabhai Space Centre, etc, has been the primary entity responsible for the manufacturing and launch of space objects. However, it is relevant to note that the manufacturing of all ISRO launch vehicles was ably supported through the back-end assistance of other private entities in the market (such as Godrej Aerospace, Larsen & Toubro, ACL, etc) that were

involved in supplying parts and components for manufacturing, through a subcontracting model.

As discussed in **2.1 Characteristics of the Space Industry**, India has its own space programme and has launched numerous launch vehicles and satellites for the purposes of space exploration including landing a rover on the south pole of the moon and the world's least expensive Mars mission, etc.

Further, India has relied on space assets for purposes including weather forecasting, disaster management and national security.

India has further, through its commercial arm ACL, facilitated the launching of space assets for several other countries including the USA, the UK, Japan and Germany. With the onset of NewSpace and the liberalisation of the space sector, ISRO and IN-SPACe through NSIL have made efforts towards technology transfer in the industry. Currently, several private entities in India (such as Skyroot Aerospace) are involved in designing, manufacturing and building space launch vehicles.

2.7 Commitment to International Treaties and Multilateral Discussions

International Treaties/Multilateral Relations

India has been an active participant in international space law developments and is a signatory to various international treaties such as the India-International Treaties (listed in **1.1 The New Space and Space Tech Economy**).

Moreover, India has entered into bilateral and multilateral relations with multiple countries and space agencies for peaceful uses of outer space. In the last five decades, India has signed over 260 space co-operation documents with 61 countries and five multinational bodies including

the USA, Mexico, Japan and France in domains such as earth observation, climate actions, space exploration and space situational awareness.

International Committee/Conferences

India has been a member of the Committee on the Peaceful Uses of Outer Space (COPUOS) since its inception in 1959, where it acts as the chair of the scientific and technical subcommittee's new working group on 'Long Term Sustainability of Outer Space'.

Further, India is a member of the conference on disarmament and in fact presided over the conference held earlier this year in February 2024, demonstrating its commitment to prevention of use of force/weapons in outer space.

India also actively participates in Inter-Agency Space Debris Coordination Committee (IADC) activities for space debris mitigation and the activities of the IAF Space Traffic Management subcommittee for collision avoidance, disposal of space hardware, etc, showcasing its commitment towards protection of the space environment.

Domestic Legal Framework

Under the Constitution of India, India is obligated to respect international law and treaty obligations under all treaties to which it is a signatory. Such laws become binding when codified/adopted into the domestic law of the state. NGP 2024 mandates space actors to comply with the obligations under international treaties to which India is a signatory including the India-International Treaties.

India, being a party to the Outer Space Treaty, is required to follow the 'principle of due regard' when conducting space activities and is required

to take steps to avoid harmful interference of interests of other countries. Although the principle has not been defined specifically, India implements this through imposing compliance requirements on Indian entities participating in this sector through NGP 2024.

Breach of obligations under the international treaties by any government entity and/or NGE ("Indian Entity", as defined under NGP 2024) exposes the Indian Entity to immediate reporting/notification requirements to IN-SPACe and/or the obligation to undertake mitigation measures/provide financial or other assistance, as directed by IN-SPACe.

Further, NGP 2024 also sets out detailed guidelines re third-party liability arising out of potential damages due to space activities undertaken by Indian Entities (as set out in **2.8 Insurance and State Measures on Liability for Damages**).

2.8 Insurance and State Measures on Liability for Damages

Space activities carry high risk and potential for damage – on ground, in air and in outer space. Under the Liability Convention, to which India is a signatory, the liability for damages caused lies with India, as a state. With the liberalisation of the space sector, the Government of India is aiming towards holding other space actors, including private entities, accountable for potential damages due to space activities undertaken by them.

Prior to the release of NGP 2024, the Indian government had also introduced indemnity, insurance and financial guarantee obligations onto private entities through the Draft Space Activities Bill 2017. In apprehension of such obligations, in 2023, ISpA, on behalf of private Indian space companies, deliberated a 'shared-liability model'

with the government, where liability insurance for domestic satellite and rocket companies could be distributed between the private companies and the government. However, recently, the Indian government under NGP 2024 released detailed guidelines imposing third-party liability on private entities.

Guidelines on Liability Under NGP 2024

We have set out some key aspects under NGP 2024 pertaining to liability and insurance for space actors below.

- *Third-party liability insurance policy:* All entities engaged in space activities in India including Indian Entities and non-Indian Entities are required to procure a third-party liability insurance policy, where the terms and conditions of the insurance including minimum amount, period, cap on value of insurance amount, etc shall be prescribed by IN-SPACe. Further, all such policies are required to include the Government of India as an insured entity.
- *Contractual considerations:* All launch service agreements/launch contracts between a launch operator and a non-Indian Entity, for any space launches being undertaken by Indian Entities, should include a specific clause transferring the third-party liability arising to the respective non-Indian Entity.
- *Indemnification:* All losses, damages, costs, fees or other expenses incurred by IN-SPACe/the Government of India or its agencies under the Liability Convention or otherwise, which are attributable to an entity authorised by IN-SPACe to carry out space activities, are to be recoverable from such authorised entity.

Market Insights

Given the nascency of and lack of transparency in the space insurance sector, market data in this sphere is rare. However, recent research conducted by Spaceport SARABHAI, on the basis of a survey of leading experts in the Indian insurance industry, reveals some insights into the space insurance sector. Currently, only three types of insurance policies are available in the market – launch and in-orbit insurance, satellite life insurance and space liability insurance. However, the details of insurance providers providing these insurance policies in the market are not publicly available. Further, given the lack of precedents for such products on offer, there is no clarity on the premium amounts that would be offered by insurers. That said, in light of the developments under NGP 2024, it is anticipated that the space insurance industry will rapidly mature to address aspects of space insurance and also account for diverse space insurance offerings.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities

ISP 2023 defines 'space activities' as activities "pertaining to the space sector including launch, operation, guidance and/or re-entry of space object from outer space". All space activities are regulated by IN-SPACe, which accords authorisations in accordance with NGP 2024. All entities carrying out space activities to or from the Indian territory or within the jurisdiction of India including the areas within its exclusive economic zone are required to seek authorisation from IN-SPACe.

It is relevant to note that authorisations under NGP are only valid for a specific period, and

a separate authorisation from IN-SPACe is required in order to conduct the space activity beyond the validity period or expand the scope of its services.

Further, NGP 2024 requires space activities to be conducted in accordance with globally recognised best practices prevailing in the industry (where specific standards are not explicitly prescribed) including in areas such as data encryption, cybersecurity, etc. Notably, the space economy in India has not matured enough to percolate through to sector benefits and accordingly, current regulations on space activities are agnostic to their impact on different sectors. That said, it is expected that the percolation through to different sectors such as healthcare and life sciences, agritech, environment and energy will occur in the near future.

Under ISP 2023, a ‘space object’ is defined as “any object launched or intended to be launched into an orbital or sub-orbital trajectory around the earth or to a destination beyond earth orbit, any constituent element of such an object or any other object as notified from time to time”. NGP 2024 requires every ‘space object’ owned and controlled by an Indian Entity to be registered in the Indian national register of space objects.

In addition to general rules pertaining to space activities, NGP 2024 contains certain key considerations/restrictions as set out below.

- **Definitions of ‘Indian Entity’, ‘KMP’ and ‘Control’:** As discussed in **2.4 Role of the State in the Licensing Process**, generally, only Indian entities that are controlled and operated by Indian citizens, ie, where the majority of the Key Managerial Personnel (KMP) are Indian citizens, are permitted to seek authorisation from IN-SPACe. It is relevant to note that NGP

2024 provides for a different definition of KMP under different permissible structures such as companies, limited liability partnerships and trusts. Further, ‘control’ refers to the right to exercise control over the management or policy decisions of the operator, whether directly or indirectly, through one or more persons acting individually or in concert.

- **Change in control:** NGP 2024 mandates requirement of a fresh authorisation by entities, in the event of any change in the management and control of an authorised entity or an equivalent change in the partnership or trust, resulting in the transfer of control to a non-Indian entity or entities, or if the authorised entity is no longer under Indian management and control. Further, authorised entities are required to notify IN-SPACe in the event of any change in shareholding pattern, any change in KMP, or any equivalent change in partnership or trust.
- **Data disseminators:** NGP 2024 permits only Indian entities to seek authorisation for dissemination of data, although the user of such data can be any individual, NGE, government entity or non-Indian entity. Further, authorised data disseminators are required to verify the credentials of the user prior to disseminating data and are required to undertake best efforts to ensure data is not re-disseminated.
- **Access to international orbital data:** In past years, satellite players in India were not allowed to use non-Indian orbital resources and only had access to Indian orbital resources. Through NGP 2024, India has permitted local satellite companies to use foreign orbital resources, thereby providing impetus to the satellite communications space. Indian players can now approach the ITU to use non-Indian orbital resources; however, an authorisation from IN-SPACe and compliance with

principles of non-interference and prevention of harmful interference are mandatory.

3.2 Principles of Non-interference and Prevention of Harmful Interference

India has demonstrated its commitment towards ensuring non-interference with activities of other space-faring nations and has introduced measures to prevent harmful interference with other spacecraft or space missions in its domestic framework.

In addition to being a signatory to international treaties including the Outer Space Treaty and the Liability Convention, India has been conscious of principles of non-interference and prevention of harmful interference in its space law framework as it has evolved over the years. The Draft Space Activities Bill 2017 propose to impose an obligation on entities engaged in space activities to avoid interference with the activities of other in the peaceful exploration and use of outer space.

More recently, NGP 2024 introduced non-interference and harmful interference as a critical parameter for IN-SPACE's evaluation in the granting of authorisations to entities for carrying out space activities. Particularly, in respect of space communication, an entity seeking authorisation for the establishment and/or operation of a satellite/constellation for communication services or establishment and/or operation of a remote sensing and amateur satellite system is mandatorily required to undertake a detailed interference analysis, along with an explanation of its strategy for coexistence for providing services over the intended area without harmful interference (unless a co-ordination/coexistence agreement with the relevant satellite system already exists, in which case, reference to such agreement can be made in the application). This interference analysis and strategy explana-

tion is further supplemented by an undertaking/declaration to be submitted by the operator to ensure interference-free services and no harmful interference to other satellite networks. Further, in cases of harmful interference, IN-SPACE reserves the right to intervene, to terminate, suspend or reject the granting of authorisation or to direct the operators to cease emissions.

It is relevant to note that through the introduction of such requirements under NGP 2024, India has adopted a proactive and precautionary stance as opposed to a reactionary stance towards non-interference and prevention of harmful interference, where the burden of justification lies with the space operators, prior to undertaking space activities.

3.3 Operators' Responsibilities

NGP 2024 imposes certain duties and responsibilities on the space operators including adhering to safety and security guidelines, and limiting space debris and adverse environmental impacts. In relation to the operation of space transportation systems, any establishment and operation of launch facilities by Indian entities requires an environmental clearance from the relevant authorities.

In addition to a submission of undertaking confirming compliance with the Space Debris Mitigation Guidelines of UN-COPUOS, the guidelines for satellites under NGP 2024 state that the design of satellites must take into consideration minimisation of debris creation both during the operational mission period and during passivation.

Further, prior to seeking registration of space objects, operators are required to specify the orbit for launch, after conducting an assessment on space environmental population, ie, the den-

sity of space objects in space. For operation of space transportation systems, in relation to the configurations of the launch vehicles, operators are required to submit debris (spent stages) related information. Further, as a post-registration compliance, immediately after launch of space objects, operators are required to report details of any impact on the space environment to IN-SPACe.

Therefore, NGP 2024 sets out a holistic checks-and-balances regime for mitigation of space debris at every stage, from design and configuration to launch and post-launch.

Separately, at the recently held annual meeting of IADC in Bengaluru, India announced its intent towards Debris Free Space Missions (DFSM), an initiative beginning in 2025 to ensure zero-debris space missions by 2030. The ISRO system for safe and sustainable space operations management (IS4OM) under DOS has been designated as the nodal agency supervising progress and implementation of DFSM. Notably, recently, the rocket launched under ISRO's XPOSat mission between January and March 2024 plunged into the ocean without leaving behind any space debris.

Earlier in 2019, ISRO also launched 'Project NETRA (Network for Space Object Tracking and Analysis)', an early warning system in space to detect debris and other hazards to Indian satellites, that aims to create greater space situational awareness.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

In India, extraterrestrial resources are not considered the property of the nation/international community and/or finders/processors per se. However, a rights framework exists with respect to certain extraterrestrial resources.

For instance, under ISP 2023 certain orbital resources, ie, any GSO slot and/or NGSO along with the associated frequency spectrum and coverage acquired or in the process of being acquired by the Indian administration through a filing with the ITU, are categorised as 'Indian Orbital Resources'.

Further, ISP 2023 encourages NGEs/private entities to engage in commercial recovery of an asteroid resource or space resource. NGEs/private entities engaged in such a recovery process are entitled to possess, own, transport, use and sell the asteroid/space resource in accordance with the international obligations of India and other applicable law. In this approach, India has positioned itself similarly to the USA and Japan, which grant private entities rights to space resources.

4.2 Granting of Rights to Space Resources

Although ISP 2023 grants rights to space resources to private entities as discussed in 4.1 **Nature of Space Resource Rights**, NGP 2024 discourages Indian entities from asserting sovereign claims on the whole or a portion of outer space, including over resources extracted from space.

At the same time, NGP 2024 recognises that all forms of extraction and utilisation of space

resources do not amount to appropriation and, in an attempt to regulate the space, mandates Indian entities to obtain a separate authorisation from IN-SPACe prior to executing any plans to extract or utilise space resources. Such authorisation is subject to considerations including the necessity of undertaking such activities and the likelihood of them causing harmful interference to the space activities of other persons/nations. The authorisation process and timelines have been specified in **2.4 Role of the State in the Licensing Process for Space Activities**.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

India has undertaken and adopted a number of measures in relation to mitigation of adverse environmental impact and space debris (as discussed in detail in **3.3 Operators' Responsibilities**) which illustrate India's commitment to protection of the space environment. NGP 2024 prescribes that any dereliction of such responsibilities regarding the space environment by Indian entities may result in revocation/cancellation/withdrawal of the authorisation granted by IN-SPACe to such entity.

Further, the Indian State is obligated under the Constitution of India to endeavour to protect the environment of the country and has accordingly specified detailed regulations pertaining to protection of the environment.

To that end, it may be relevant to note that the Draft Space Activities Bill 2017 proposes that every person who causes damage or pollution to the environment of the earth, airspace or outer space including celestial bodies as a result of any space activity will be liable to imprison-

ment up to three years and/or with a fine of up to INR1,50,00,000 (approximately USD180,000). Although no such provision has been specified under ISP 2023/NGP 2024, taking into consideration India's proactive efforts on this front, it is likely that, going forward, future space-related legislations in India will include strict penalties in relation to environmental breaches.

5.2 Climate Change and Space Activities

Apart from the frameworks governing environment-related space activities as discussed in **5.1 Environmental Protection in Space** and **3.3 Operators' Responsibilities**, India currently does not have any specific legislation addressing climate change in relation to space activities. Having said that, it has undertaken several initiatives including satellite missions, independently and in collaboration with other countries, in this regard.

- India is at the frontier of the G20 SAT: Satellite Mission for Environment and Climate Observation, where India aims to provide spacecraft bus, satellite assembly, integration testing, etc for the launch of a satellite with payloads for environment and climate observations.
- In collaboration with NASA, in the latter half of 2024, ISRO plans to launch a radar satellite, NISAR, which will monitor the earth's changing ecosystems, dynamic surfaces and ice masses, in an effort to study the hazards of climate change.
- Further, India has set up a database titled 'National Information System for Climate and Environment Studies' (NICES) to monitor climate change. In 2022, ISRO conducted a workshop on space-based information support for climate and environmental studies under NICES, thereby expanding NICES for monitoring climate change in relation to space activities.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

The taxation regime in India is multifaceted, comprising both direct and indirect taxes administered by the Union government and state governments. Broadly, the direct tax regime is governed primarily by the Union government and comprises income tax, corporate taxes and capital gains taxes. On the other hand, India's indirect taxes are levied on goods and services, under the Goods and Services Tax (GST) and other taxes such as customs duties, excise duties and various other social welfare contributions.

Direct Tax

There is no special tax regime for taxation of income derived from space activities in India. Consequently, the income derived from space activities would be taxable as per the general tax law in India in accordance with the Indian Income Tax Act, 1961 ("IT Act") and the rules contained therein. We have set out certain key considerations in this regard:

- The IT Act taxes Indian residents on their worldwide income and non-residents on income sourced from India. Note that certain tax benefits may be available for non-residents who are tax residents of a country with which India has entered into a tax treaty.
- Indian resident taxpayers are liable to pay tax on business profits, and tax rates differ on the basis of the legal status of the taxpayer. For non-residents earning income from business activities in India or by rendering services to Indian entities, taxability depends on the nature of the activities, the manner in which the activities/services are rendered, etc; ie, essentially, whether a taxable presence is created, ie, a business connection is established

or a permanent establishment (PE) is created in India.

- In the absence of a PE, non-resident Indians are liable to pay tax on royalties earned subject to withholding of tax in India at 20% and/or any tax treaty benefits. It is relevant to note that 'royalties' are defined broadly under the IT Act and include payments made for the right to use a piece of computer software; payments for the use of, or right to use, any industrial, commercial or scientific equipment; and payments made for transmission of signals by a satellite.
- Pertinently, the taxability of income derived by non-resident satellite companies for transmission of signals (which are ultimately used by consumers in India) has been subject to litigation in India, with the tax authorities alleging that it creates a PE in India and hence is taxable as business income. However, Indian courts have largely ruled in favour of such taxpayers by invoking the beneficial provisions under various tax treaties and have held that a satellite traversing across Indian territories cannot constitute a PE.
- Further, India also charges an equalisation levy on income derived by non-resident 'e-commerce operators' from 'e-commerce supply or services'.

Indirect Tax

The indirect tax regime in India is a transaction-based taxation regime, under which events such as import, export, supply (including sale, transfer, lease, etc) of goods and/or services are subject to the levy of duties and taxes.

Accordingly, the indirect tax regime vis-à-vis space activities would entail the levying of customs taxes/duties on a transaction entailing supply of any space products and/or components thereof (both on ground goods, such as launch

vehicles, and on objects meant for launch into space) and space activities (both upstream and downstream segments). As such, the import and export of space products and components are subject to customs duties, whereas local supply thereof and space activities (qualifying as supply of services) are subject to GST.

6.2 Tax Incentives for Space Investors

Currently, India does not have a central scheme/policy to incentivise private investments in the space sector, although certain tax incentives for enterprises engaged in space activities exist, as set out below.

- R&D expenditure incurred by taxpayers is tax deductible subject to satisfaction of certain conditions.
- Payments made for ‘satellite launch services’ are exempt from GST.
- In the context of space products and components, the existing customs framework grants exemption from customs duties for satellites, orbital launch vehicles, sub-orbital launch vehicles and components thereof (including boosters, payload fairing, adaptors and separation systems), satellite launchers, spacecraft, fuel and propellant tanks, and safety systems. Similarly, the local supply of such space products and components is exempt from GST.
- Import and local supply of specific functional accessories of such space products, ie, radars, satellite networking equipment, satellite communication terminals, radio frequency equipment, tracking systems, communication terminals (modems and routers), scientific instruments and sensors (including cameras and magnetometers), are subject to a concessional rate of customs duties and GST respectively.

Further, ISpA has made representations to the Indian government regarding various tax exemptions to boost the space industry. Such representations include wider GST exemptions for space activities, tax holidays for enterprises engaged in the space sector, a concessional tax rate for interest paid on external commercial borrowings, subsidies on capital investments, etc.

Notably, the state governments of Telangana and Karnataka, being the hub of space-related activities in India, have announced financial incentives such as subsidies and reimbursements of capital costs incurred by space tech companies. As part of the incentive package, the state governments have promised reimbursement of a certain portion of the local taxes and duties (levied by the respective state governments) incurred by the space tech companies for their business operations in these states.

6.3 Taxation on Sale or Transfer of Space Assets

Under the direct tax regime in India, the taxability of the sale or transfer of space assets would be governed under the IT Act and would depend on whether such assets are ‘business assets’ or ‘capital assets’.

Under the indirect tax regime, the existing GST framework recognises various space activities and seeks to levy tax thereon as supply of service. Notably, upstream space activities, ie, freight services (ie, carriage of satellite and other payloads) and satellite launch services are exempt from GST. However, activities relating to manufacturing and development of such engineering services with respect to space assets, maintenance and repair of satellite vehicles and launch vehicles are subject to GST. Further, downstream activities including Positioning, Navigation and Timing (PNT) applications, ser-

vices, research and experimental development services, geological and geophysical consulting services, mineral exploration and evaluation, weather forecasting and meteorological services, etc are also subject to GST.

Currently, the corresponding tax policy around some of the activities contemplated for the private sector, ie, passenger carriage, launch pad management for transportation, insurance for space assets and operations, is not specifically encompassed within the existing tax framework. However, with the release of ISP 2023 and NGP 2024, the government intends to adapt the tax framework to include such space activities.

Space products and components are considered sensitive goods and are a matter of national security. Accordingly, the export of identified space objects and technologies related thereto is regulated and requires authorisation from the Directorate General of Foreign Trade, the nodal agency for trade-related regulations and enforcement in India.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

Over the last five years, India has seen a significant transformation in the Indian space sector characterised by democratisation of space and liberalisation of the sector to encourage entry of private stakeholders.

Drivers of NewSpace in India: Notably, there has been an exponential rise in the participation of NewSpace companies and startups driven by regulatory reforms including the Indian Space Policy 2023 and NGP 2024, financial investments, recently introduced FDI reforms (as

discussed in 7.4 **Foreign Investment in Space Activities**), international collaborations for facilitating technology exchange, transfer and research and development. Tangibly, the number of space tech startups has seen a jump from one in 2014 to around 189 as of December 2023.

Segmentation of NewSpace in India: Today, the activities of NewSpace actors in India have seen a shift from traditional space activities towards more segmented activities including upstream, downstream and auxiliary activities.

- *Upstream activities:* Involve satellite manufacturing, launch services and space transportation. Satellite miniaturisation, ease of access, and low-cost and improved global supply chains constitute key drivers of the upstream segment.
- *Downstream activities:* Involve application of space data towards communication, navigation, earth observation services, etc. Enhanced computational capabilities, demand for global connectivity and government focus on use of space for SDGs constitute key drivers of the downstream segment.
- *Auxiliary activities:* Involve space insurance, education and training programmes, etc. Increased commercialisation, collaborations, technology transfers, etc constitute key drivers of the auxiliary segment.

Investment scenario and forecast: Such diversification of capabilities by NewSpace actors has attracted significant venture capital investments. In the NewSpace era, Indian space tech startups have raised over USD250 million. Companies that have received venture capital funding over the last couple of years are in advanced stages of their operations, with certain companies setting up their manufacturing plants and planning

launches in the next few years. This is likely to result in a significant increase in their valuations.

Admittedly, financial investors in the sector are very bullish, and a number of new-age private entities raised significant amounts of early-stage/growth capital in the year 2023. In fact, it is anticipated that, in 2024, funding by space tech companies will surpass previous benchmarks and lead to supercharged growth in the activities and operations of companies engaged in this sector. Further, the opening up of the FDI space is likely to encourage local investments in the space sector. As an estimate, the Indian government believes that India's space economy will soar to USD40 billion by 2040.

7.2 Finance Sources for Space Activities

Government funding: Given that the space sector in India was largely government-dominated for five decades, funding from the government constituted one of the main sources of finance for space activities. DOS, as the nodal space department, was allocated funds from the Union Budget of India for space programmes, satellite launches, infrastructure development and other research and development activities. Further, in addition to government funding, DOS also generates revenue through its commercial arms, ACL and NSIL, engaged in marketing and commercial space activities.

Private investments: In the last few years, with the onset of NewSpace, private investments including from venture capital firms, private equity investors, incubators, accelerators, etc have played a large role in the growth of the space startups ecosystem, although limited to equity funding and generally at an early stage. During March-December 2023, space startups have attracted investments worth USD124.7 million.

Other government initiatives: Separately, government initiatives such as IN-SPACe's recent SEED Fund Scheme to provide INR1 crore/USD121,000 to space startups alongside mentorship and training support, have added to the sources of financing available in India.

Subsidiaries/joint ventures for foreign entities: Notably, NGP 2024 mandates foreign entities desirous of engaging in space activities in India to incorporate an Indian subsidiary or enter into a joint venture or other such collaboration arrangements with Indian entities to seek authorisations from IN-SPACe, thereby encouraging foreign investments in the space sector in the form of subsidiaries and joint ventures.

7.3 Attracting Investment for Space Activities

Enhanced private participation: With the introduction of ISP 2023, NGEs/private entities were permitted to engage end-to-end in all domains of the space actor, attracting investment from several investors including Alphabet Inc, which invested USD36 million in a Bengaluru-based satellite imaging startup, Pixxel.

Regulatory reforms: Recent government, legislative and policy reforms have steered towards attracting greater investments in space activities. Arguably, the regulatory regime is still unclear on certain aspects; however, with the release of NGP 2024, there now exists higher regulatory clarity on various aspects and activities in the space sector. Further, efforts by ISRO towards the granting of governmental contracts to private entities have offered investors much-needed assurance, thereby facilitating capital investments even amidst the regulatory flux.

Tax incentives: The Indian government's efforts towards providing tax incentives as outlined in

6.2 Tax Incentives for Space Investors make India a key destination for investors in the space sector.

Infrastructure: India has a robust foundation of launch space infrastructure, and ISRO provides access to its testing facilities, infrastructure and expertise, all of which form key attractions for investors.

7.4 Foreign Investment in Space Activities

Historically, the Indian space sector was restricted and predominantly controlled and operated by the government. In 2020, the Indian foreign direct investment policy (“FDI Policy”) in the space sector was amended, and certain reforms were introduced, to encourage private sector participation in the ‘establishment and operation of satellites’ sector. However, such investments were permitted only under the government approval route.

More recently, in 2024, the Indian government approved amendments to the FDI Policy, further liberalising the sector and providing impetus to its growth in India. The amendments allow for foreign direct investments under the automatic route (where no government approval is required) to varying degrees, and subdivisions/subsectors have been created for underlying activities within the larger sphere of ‘establishment and operation of satellites’. The entry routes for the various activities under the FDI Policy are categorised follows:

A. Up to 100% under automatic route – manufacturing of components and systems/subsystems for satellites, ground segment and user segment;

B. Up to 74% under automatic route – satellite manufacturing and operation, satellite data products and ground segment and user segment; and

C. Up to 49% under automatic route – launch vehicles and associated systems or subsystems, creation of spaceports for launching and receiving spacecraft.

Note that investments beyond 74% under category B and beyond 49% under category C require prior approval of the relevant sectoral regulator under the government route.

In addition to this, any foreign direct investment from any countries that share a land border with India (ie, Pakistan, China, Bangladesh, Bhutan, Afghanistan, Nepal and Myanmar) requires prior government approval.

7.5 Role of Securities Markets in Space Financing

The role of securities markets in financing space activities in India is yet to mature. Given the nascentcy of NewSpace actors, public offerings/trading of securities in public markets vis-à-vis space companies will have its gestation period in India and we anticipate that Indian space tech companies will list on the stock exchanges in the coming few years.

Having said that, there exist certain conglomerates that are listed companies and have diversified their investments and ventured into the space sector including Bharti Enterprises Limited, Larsen & Toubro Limited, Hindustan Aeronautics Limited and Apollo Micro Systems. As specified in **2.6 Role of the State in the Launching Process**, these private entities have ably supported ISRO and other public sector enterprises in relation to their space-related activities

and have contributed to development of Indian launch vehicles and space missions.

At present, the activities of this group of companies constitute the limited role that the securities market in India plays in the space sector. However, with the advent of new technologies and liberalisation of the FDI Policy, it is expected that the securities market will contribute to the financing of space activities in a significantly larger manner.

Trends and Developments

Contributed by:

Sanchit Agarwal, Pulkit Chaturvedi and Shreshth Singh Tomar
Khaitan & Co

Khaitan & Co was founded in 1911 by Late Debi Prasad Khaitan, and is among India's oldest and most recognised full-service law firms. Built on foundations of integrity, simplicity, dedication and professionalism, the firm's presence is in Kolkata (1911), New Delhi (1970), Bengaluru (1994), Mumbai (2001), Singapore (2021), Pune (2023) and Ahmedabad (2024). The firm services clients across all practice areas including foreign direct investments, M&A, private equity and venture capital investments, regula-

tory, corporate and commercial, data privacy, disputes, tax, intellectual property, telecommunications, media and technology, employment, etc. Khaitan & Co is firmly placed to provide the best legal, regulatory and commercial advice to companies engaged in the space tech sector, given its expertise in diverse areas and sectors of law. As a full-service law firm, it brings a wealth of knowledge and experience across sectors and areas, and is ably placed to provide high-quality service to its clients.

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On 10 August 2023, the Government of India (“GoI”) introduced the Indian Space Policy – 2023 (“Policy”) to augment the capabilities of companies involved in the space sector and provide a regulatory framework. The Policy outlines the vision, strategy and guidelines for enhancing the participation of non-government entities (NGEs) across the entire value chain of the space economy, thereby shifting the current supply-driven space economy to a demand-driven model. With the aim of revolutionising the space sector by enhancing the participation of NGEs, fostering innovation and providing a robust regulatory framework, the Policy is intended to be a positive catalyst and act as the rocket fuel for the rapid development and growth of India’s space sector. At its core, the Policy envisions augmenting India’s space capabilities, driving technological innovation and leveraging space for socio-economic development. To achieve this vision, the Policy adopts a multifaceted strategy, by providing regulatory certainty to actors involved in the space sector and providing measures for encouraging advanced research and development, providing public goods and services using space technology, creating a stable regulatory framework, promoting space-related education and innovation, and using space as a driver for overall technology development.

The Policy delineates the roles and responsibilities of four important entities that play crucial roles in implementing the policy, ensuring compliance, fostering industry growth and promoting international co-operation. The four entities that have been handed the baton for implementation of the Policy under the aegis and supervision of Department of Space (“DoS”) are: (i) the Indian Space Research Organisation (ISRO), responsible for research and development; (ii) NewSpace India Limited (NSIL), a public sector enterprise in the space sector, responsible for supplement-

ing the demands of the industry; (iii) the Indian National Space Promotion and Authorisation Centre (“IN-SPACe”), the sectoral regulator, which acts as the interface between ISRO and NGEs; and (iv) the Department of Telecommunications (“DoT”), responsible for management of space activities utilising radio spectrum. In addition to these entities, the DoS is responsible and acts as the nodal department for implementation of the Policy and oversees the distribution of responsibilities outlined in the Policy.

IN-SPACe, an autonomous single-window nodal agency within the DoS, was set up in June 2020 with a mandate to authorise all space activities undertaken by the GoI and NGEs in the country. IN-SPACe acts as the promoter, enabler, authoriser and supervisor of the Indian space ecosystem, and was inaugurated and operationalised in June 2022 to regulate the space sector and supervise private enterprises and startups to undertake space activities.

IN-SPACe’s primary responsibility is to authorise various space activities, such as building of launch vehicles, satellites, payloads, establishing ground stations and data dissemination. IN-SPACe is also responsible for identifying technologies developed by ISRO and facilitating transfer of technology from ISRO to private industries, in accordance with the Policy.

In furtherance of its mandate, on 4 May 2024, IN-SPACe released ‘Norms, Guidelines and Procedures for Implementation of the Indian Space Policy-2023 in respect of Authorization of Space Activities’ (NGP) by Indian entities.

Authorisation Requirements

The NGP prescribes the authorisation requirements for Indian entities engaged in the space sector and undertaking space activities. It

requires every entity carrying out space activity to or from Indian territory or within the jurisdiction of India to seek authorisation from IN-SPACe. The NGP permits a wide array of space activities including launch, operation, guidance and/or re-entry of any space object. Key activities that require authorisation from IN-SPACe are:

- establishment and/or operations of space object(s), including space-based communication services, remote sensing and amateur satellite systems, hosted payloads, establishment and/or operation of space objects other than communication and remote sensing satellite systems;
- operation of space transportation systems, including sub-orbital and/or orbital launches from Indian territory and/or outside the territory of India;
- planned re-entry of space objects with or without recovery;
- establishment and/or operation of the ground systems, including satellite control centre;
- dissemination of space-based earth observation/remote sensing data, including high-resolution space-based earth observation/remote sensing data pertaining to Indian territory; and
- sale/purchase/transfer of space objects in orbit.

Entities Eligible for Authorisation

Only Indian entities, both government entities and NGEs, are permitted to seek authorisation under the NGP. Non-Indian entities that wish to operate in the Indian territory can seek authorisations through Indian entities under the NGP. An indicative list of permissible corporate structures, including subsidiaries, joint ventures, partnerships or trusts, for an arrangement between an Indian entity and a non-Indian entity are set out under the NGP. However, for certain activi-

ties such as communication services and the dissemination of space-based earth observation and remote sensing data, non-Indian entities can seek direct authorisation from IN-SPACe.

Process of Authorisation

The NGP provides for a dedicated portal for application to seek authorisation from IN-SPACe at IN-SPACe Digital Platform (IDP). In order to seek authorisation from IN-SPACe, the Indian entity must be managed and controlled by Indian citizens with majority of the Key Managerial Personnel (KMP) holding Indian citizenship. It is relevant to note that the NGP provides for a different definition of KMP under different permissible structures. For companies incorporated under the (Indian) Companies Act, 2013, KMP includes the Chief Executive Officer (CEO), managing director, manager, company secretary, whole-time director, Chief Financial Officer (CFO), Chief Operating Officer (COO) and other officers as prescribed by the Companies Act or IN-SPACe. For partnership firms under the (Indian) Limited Liability Partnership Act, 2008, KMP includes partners and designated partners, as well as the Chief Managing Director (CMD), CEO, CFO, COO or equivalent. For trusts under the Indian Trust Act, 1882, KMP includes the author, trustees, CEO, CMD, CFO, COO or equivalent.

However, in all cases, 'control' refers to the right to exercise control over the management or policy decisions of an applicant, whether directly or indirectly, through one or more persons acting individually or in concert. This includes the right to appoint the majority of directors or KMP, or to control management or policy decisions through shareholding, management rights, shareholders' agreements, voting agreements, partnership agreements, confidence of trust or any other means.

While the application form mandates varying levels of compliance and disclosure based on the proposed activity to be undertaken, the common denominator is the requirement of financial and technical credentials, and operational, infra-structural and technical capabilities in relation to the activity proposed to be undertaken by the applicant. Applicants must also disclose their net worth, significant beneficial owners (if any) and criminal records (if any), and obtain security clearance (if sought by IN-SPACe).

Duties of the Applicant

The NGP imposes certain duties on the applicants, and dereliction of these duties may result in revocation of the authorisation by IN-SPACe. These duties include adhering to safety and security guidelines, limiting space debris and adverse environmental effects, complying with liability policies, providing necessary information to IN-SPACe, notifying IN-SPACe of any changes or incidents, refraining from asserting sovereign claims on outer space, and complying with all terms and conditions of the authorisation.

Space-Based Communication

The NGP also meticulously regulates space-based communication services to ensure compliance and efficiency within the burgeoning industry. Chapter IV of the NGP emphasises the necessity for authorisation, mandating that any satellite or constellation, whether owned by an Indian or non-Indian entity, seeking to provide communication services over Indian territory or beyond must obtain explicit permission for establishment and operation.

Indian entities are accorded the opportunity to seek authorisation for their own satellites or constellations, regardless of whether they are self-realised, procured, or acquired in orbit, using either Indian or non-Indian orbital resources.

Additionally, non-Indian entities intending to provide satellite communication services within Indian territory are required to obtain authorisation through IN-SPACe. Once authorised, Indian service providers and users are obligated to exclusively utilise the services of satellites or constellations approved by IN-SPACe. Furthermore, the regulatory framework places the onus of bearing the risks and costs associated with space-based communication services solely on the service providers and users, precluding any recourse against governmental agencies such as IN-SPACe or the DoT. These regulations aim to foster a regulated environment that promotes responsible utilisation of satellite resources while upholding national interests and international standards.

Operation of Space Transportation Systems

Any Indian entity planning an orbital or sub-orbital launch of a space transportation system, regardless of ownership status (self-owned or leased launch facility), must obtain authorisation from IN-SPACe in accordance with the NGP. Similarly, non-Indian launch operators must also seek authorisation through an Indian entity. Authorisation is specifically required for sub-orbital launches with a total impulse of 40,960 newton-seconds or more at lift-off.

Prior to launch, the launch operator is obligated to comply with the applicable Space Debris Mitigation Guidelines as established by the Committee on the Peaceful Uses of Outer Space, 2007 (UN-COPUOS). Additionally, adherence to the Guidelines and Procedures for Registration of Space Objects and the framework for safe and sustainable space operations provided by DoS is mandatory.

Detailed information about the launch mission, including various failure scenarios, the proba-

bilities of those failures, fragmentation patterns, reliability values, and identification of impact and danger zones, must be furnished for technical assessment by IN-SPACE. Authorisation for each launch is granted by IN-SPACE through an expert committee after thorough evaluation of these technical parameters. To ensure safety, an 'Advisory Note' from IN-SPACE is required for every launch, in order to ensure that the 'notice to airmen' (NOTAM) and navigational area (NAVAREA) warnings on the danger zones are issued as an alert by the relevant authorities, at least 45 days prior to a launch. The responsibility to confirm the issuance of relevant NOTAMs and NAVAREA warnings and manage them till and after the launch is on the applicant. IN-SPACE sets specific time frames within which launches must occur, and any alterations to those time frames or modifications to the danger zone require updated authorisation from IN-SPACE.

Guidelines for the Utilisation of Orbital Resources

The NGP mandates collaboration between IN-SPACE and the Wireless Planning & Coordination Wing of the DoT (WPC) to identify unutilised co-ordinated/allotted orbital resources or unused International Telecommunication Union (ITU) filings and allocate them to Indian entities. Resources earmarked for government-approved satellites or undergoing government approval are exempt from allocation.

An Indian entity can utilise orbital resources in the following three ways: (i) it can use the unutilised co-ordinated/registered ITU under Indian administration for unutilised ITU allotted/assigned to Indian administration; (ii) it can use unutilised ITU filings that are in the co-ordination stage under Indian administration; or (iii) it can also apply for a fresh ITU filing under Indian administration through WPC. It is relevant to note that in order

to apply for any of the above three categories, an authorisation from IN-SPACE is required.

IN-SPACE, in collaboration with the DoT, determines base prices and other financial terms for resource allocation. Decisions made by IN-SPACE regarding selection of beneficiaries are binding. Upon selection, beneficiaries receive an 'Advisory Note' from IN-SPACE granting permission to utilise the allocated resource. However, this note does not confer spectrum rights or authorisation to establish and/or operate the space object.

WPC and IN-SPACE oversee progress in completing various tasks such as co-ordinating with other administrations/satellite operators and registering satellite network filings. Failure to make satisfactory progress within the allocated time frame may lead to cancellation or revocation of the orbital allocation.

If applicants wish to relinquish or surrender the ITU filing, they must communicate their progress, along with timelines and reasons, to IN-SPACE. IN-SPACE may then reallocate these relinquished/surrendered resources at its discretion. Alternatively, applicants may transfer/sublet the ITU filing or frequency assignment to another Indian entity, subject to approval from IN-SPACE and meeting other relevant criteria.

Following deployment of the satellite in orbit and its successful registration in the Master International Frequency Register (MIFR), the applicant retains the right to utilise the orbital resource/frequency assignment as long as it operates the satellite. These provisions and procedures also apply in situations where an Indian entity brings the operations of a non-Indian satellite into the ITU filing/satellite network through IN-SPACE authorisation.

Registration of Space Object

The NGP defines “space object” to include any object launched or intended to be launched into an orbital or sub-orbital trajectory around the earth or to a destination beyond earth orbit, any constituent element of such an object, or any other object as notified by IN-SPACe from time to time (“Space Object”). The registration of Space Objects in the Indian national register of space objects is mandated under the NGP, given the international obligations on the Gol under the various treaties and conventions, that impose liability on the state for any space objects launched from its jurisdiction.

The eligibility criteria for registration include ownership and control of the Space Object by an Indian entity, and the consent of both the Indian and non-Indian entity in the case of a subsidiary/joint venture/franchise/partnership. The registration process involves pre-registration and post-registration procedures, including evaluation of information for correctness, consistency, and compliance with space debris mitigation requirements. Operators are required to report certain events and provide periodic updates on their space activities. Any plan for mission life extension must be submitted to IN-SPACe with necessary inputs no later than six months before the end of life, and the application for an extension of mission would be dealt with on a case-by-case basis based on the inputs provided.

Liability

The liability of Indian entities, foreign entities and the Gol is determined by the damage caused by their Space Object or its component parts to any other Space Object or property, or to any person, including third parties. The NGP mandates all entities engaged in space activities to procure a third-party liability policy, and Indian entities are additionally required to comply with

the guidelines included in the NGP, as well as the Convention on International Liability for Damage Caused by Space Objects, 1972 (“Liability Convention”).

Further, the NGP mandates every launch service agreement/launch contract between a launch operator and a non-Indian entity, for any space launches being undertaken by Indian entities, to include a specific clause transferring the third-party liability arising due to such Space Objects to the respective non-Indian entity. The NGP also provides that any loss, damage, cost, fees or other expenses incurred by IN-SPACe or the Gol or its agencies under the Liability Convention or otherwise that are attributable to an authorised entity are recoverable from such authorised entity.

Our Comments

For the first seven decades of India’s independence, India took great strides in the development and promotion of space activities through public sector initiatives. However, due to the absence of a national legislation pertaining to the space sector in India and the consequent regulatory uncertainty, it was difficult for NGEs and non-Indian entities to contribute to the growth of the space sector. In this context, the launch of IN-SPACe and the NGP has provided the much-needed regulatory clarity and predictability to private sector entities willing to participate in such a sensitive sector as space. Under the NGP, IN-SPACe has taken significant steps to promote Indian entities engaged in the space sector and recognise various options for structuring the arrangement between Indian and non-Indian entities.

With provisions setting out exemptions based on specific cases and mechanisms for dispute resolution and international collaboration, the

Policy sets the stage for India to emerge as a global leader in space exploration and utilisation. In addition to this, the GoI has also recently liberalised its Foreign Direct Investment (FDI) norms in a move to attract foreign investments in the space sector and has now permitted foreign investments in Indian entities engaged in this sector, subject to certain limitations, that have been created based on subclassification of the activities undertaken by those entities. These investments, collaborations and partnerships with global entities will also provide Indian entities the global expertise and knowledge of established market players, which is likely to aid in the rapid development and growth of Indian entities.

While the NGP prescribes clear guidelines pursuant to which authorisations will be granted under the Policy, it is important to note that the NGP grants authorisation with a validity period, and the authorised entity must seek a separate authorisation from IN-SPACe to conduct the space activity beyond the validity period or to expand the scope of its services. If the authorised entity decides to unilaterally discontinue, terminate or withdraw the provision of services partially or fully during the validity of the authorisation without prior notice or for reasons not justifiable to IN-SPACe, then IN-SPACe reserves the right to immediately terminate the authorisation and impose financial penalties.

In order for India to become a global hub and leader in this sector, the NGP definitely provides a much-needed impetus to private entities. That said, India and its regulatory authorities should aim to relieve themselves of their protectionist measures such that the growth of the space sector is not impaired due to over-regulation.

For example, the NGP mandates that in case of any change in the management and control of an authorised entity or an equivalent change in the partnership or trust, resulting in the transfer of control to non-Indian entity/entities, or if the authorised entity is no longer under Indian management and control, a fresh authorisation shall be required to be obtained by such entities. Moreover, the NGP mandates certain post facto notifications to IN-SPACe and requires authorised entities to notify it in case of any change in shareholding pattern, change in KMP, or equivalent changes in partnership or trust. While these requirements are in line with the government's policy of promoting indigenous space capabilities and ensuring that the country's strategic assets are not compromised, such requirements are likely to add to the compliance burden of entities engaged in this sector and may have a drastic impact (such as revocation of the authorisation) on any slip-ups. All authorised entities under the NGP should therefore ensure compliance with the NGP and create specific processes for ensuring that they meet the stringent requirements under the NGP.

The establishment of IN-SPACe and release of the NGP has propelled the growth of the Indian space sector and is likely to set out a clear path to the stars for the Indian space economy. To ensure that the developments in this sector are not marred by or face debris on its journey, the regulators and IN-SPACe will have to be nimble and receptive to the needs of market participants. However, these actions are a right step in India's direction and path towards the stars, and will hopefully lead to India being recognised as a global superpower in the space economy of the world.

JAPAN

Law and Practice

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Contents

1. Global Trends p.96

1.1 The “NewSpace” and Space Tech Economy p.96

2. Existing Legal and Regulatory Framework p.97

2.1 Characteristics of the Space Industry p.97

2.2 Legal System and Sources of Space Law and Regulation p.97

2.3 Role of the State in Space Law and Regulations p.98

2.4 Role of the State in the Licensing Process for Space Activities p.99

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.100

2.6 Role of the State in the Launching Process p.101

2.7 Commitment to International Treaties and Multilateral Discussions p.101

2.8 Insurance and State Measures on Liability for Damages p.102

3. Rules Applicable to Space Operators’ Activities p.103

3.1 General Rules on Space Activities p.103

3.2 Principles of Non-interference and Prevention of Harmful Interference p.104

3.3 Operators’ Responsibilities p.105

4. Ownership of Extraterrestrial Resources p.106

4.1 Nature of Space Resource Rights p.106

4.2 Granting of Rights to Space Resources p.106

5. Environmental Protection and Impact on Climate Change p.107

5.1 Environmental Protection in Space p.107

5.2 Climate Change and Space Activities p.108

6. Taxation of Space Activities p.108

6.1 Tax System for Space Activities p.108

6.2 Tax Incentives for Space Investors p.109

6.3 Taxation on Sale or Transfer of Space Assets p.110

7. Investment and Financing in Space Activities p.110

7.1 Impact of “NewSpace” p.110

7.2 Finance Sources for Space Activities p.110

7.3 Attracting Investment for Space Activities p.111

7.4 Foreign Investment in Space Activities p.111

7.5 Role of Securities Markets in Space Financing p.112

Nagashima Ohno & Tsunematsu is an integrated full-service law firm in Japan. We have more than 600 lawyers in total and seven overseas offices, including New York. Drawing on our broad experience and expertise in space law, we provide one-stop support to both Old Space and New Space clients, covering financing, business alliances, and contract negotiations. Our expertise in various space businesses such as satellite launch services, satellite services, on-orbit services, space resource development, commercial space travel, space insurance, and

spaceports, enables us to assist our clients in the domestic and international development of these businesses. In particular, our bilingual team is highly knowledgeable about space business, international space law, space law of the USA and other countries and international transactions, has considerable experience in contract negotiations in English with overseas space-related companies and space agencies. We also assist our overseas clients in expanding their businesses in Japan.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

International Legal and Regulatory Framework for Space Law

UN outer space treaties and soft law

The international legal framework for space activities is of considerable influence on the legal and regulatory environment in Japan. Japan has ratified or acceded to the four United Nations treaties on outer space:

- the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Outer Space Treaty);
- the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the Rescue Agreement);
- the Convention on International Liability for Damage Caused by Space Objects (the Liability Convention); and
- the Convention on Registration of Objects Launched into Outer Space (the Registration Convention).

In contrast, Japan has not ratified or acceded to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the Moon Agreement), under which private ownership of the Moon and other celestial bodies and their natural resources is prohibited.

In addition to these “hard laws”, the Japanese government also respects non-binding principles and declarations (so called “soft laws”) established by international organisations, such as the Space Benefits Declaration, the Space Debris Mitigation Guidelines, and the Guidelines for the Long-term Sustainability of Outer Space Activities. This is on the basis that these contribute to national security and are also beneficial to space activities by the international community.

Bilateral/multilateral frameworks for co-operation in space activities

The Japanese government is also keen to co-operate with other countries advanced in space technology under bilateral or multilateral frameworks. For example, Japan is a signatory to the International Space Station Intergovernmental Agreement (IGA) and has co-operated with the United States, Russia, Canada, and the other participant European countries. More recently,

Japan is a signatory to the Artemis Accord and works closely with the United States and other member countries in relation to the Artemis Program – an international lunar exploration programme proposed by NASA. In addition, the Japanese government signed with the United States government the Framework Agreement for Cooperation in the Exploration and Use of Outer Space in 2023, which covers intellectual property rights protection, cross-waiver, scientific data sharing, and the effort to exempt taxes and fees on necessary imports and exports in furtherance of the co-operation. Furthermore, Japan and the United Kingdom signed the arrangement to co-operate in space activities, including information sharing, joint training, and personnel exchange. Dialogue and discussions on co-operation in space activities are also underway with the European Space Agency, France, India, and Australia.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The space industry in Japan has traditionally developed mainly in response to demand from the national government. However, since the 2000s, the importance of commercial space development by the private sector has been recognised, and the government has encouraged the private sector to actively participate in the space industry.

Such governmental policy was materialised by enactment of the Basic Space Act (enacted in 2008), which states that the government shall take measures to promote business activities related to space development and use by the private sector. In addition, the Act on Launching of Satellites, etc. and Operation of Satellites

(enacted in 2016, the “Space Activity Act”) and Act on Ensuring Appropriate Handling of Satellite Remote Sensing Data (enacted in 2016, the “Satellite Remote Sensing Act”) established the legal framework regarding the license system for private operators to conduct launch businesses, satellite operation businesses, and businesses using satellite remote sensing devices. Through these acts, the legal framework for private operators to participate in outer space businesses has been established in Japan.

Public demand still accounts for the majority of the domain of space equipment manufacturing. However, in the space utilisation industry, especially in the fields of the satellite communication and broadcasting business, Japan has some of the world’s leading companies. In addition, several private companies have entered the launch service business, and new entrants have emerged in the development of microsatellites, on-orbit services, exploration of space resources, the establishment of lunar economy, and entertainment in outer space. In this way, the movement of private companies to participate in the space industry is now increasing in Japan.

2.2 Legal System and Sources of Space Law and Regulation

General Legal System

The legal system in Japan is based on civil law. Thus, the statute laws are the basic source of law, and case law is not strictly binding. In Japan, the Supreme Court can accept appeals of cases where decisions conflict with Supreme Court precedents, and thereby the uniformity of the interpretation of laws in courts is to be achieved. However, since appeals are not always filed for all cases, and the Supreme Court may not necessarily accept all appeals of lower court decisions that may be contrary to Supreme

Court precedents, Supreme Court precedents only have a de facto binding power.

Legal System regarding Space Law

As for space law in Japan, statute laws are the basic source of law.

The following is a summary of domestic laws regarding space activity in Japan.

Basic Space Act

The Basic Space Act provides the basic principles for the development and use of space, including compliance with international treaties, peaceful use, and promotion of industry, as well as the responsibilities of the government in realising these principles. It also stipulates that the government shall formulate a basic plan for space development and utilisation (the “Space Basic Plan”), and that the Outer Space Development Strategy Headquarters shall be established under the Cabinet to promote national policies on space development and use.

Space Activity Act

The Space Activity Act (i) establishes the license system for launch of rockets and operation of satellites conducted by private entities (see **2.4 Role of the State in the Licensing Process for Space Activities** and **2.6 Role of the State in the Launching Process**), and (ii) provides the legal structure of compensation for damages caused from space activities (see **2.8 Insurance and State Measures on Liability for Damages**). About ten years have passed since its enactment, and a review for amendment of the Space Activity Act is currently underway.

Satellite Remote Sensing Act

The Satellite Remote Sensing Act establishes the license system for the use of satellite remote sensing devices using a domestic radio station

and also provides regulations regarding restrictions on the provision of data obtained by satellite remote sensing devices to third parties (see **3.1 General Rules on Space Activities**).

Space Resources Act

Act on the Promotion of Business Activities for the Exploration and Development of Space Resources (enacted in 2021, the “Space Resources Act”) provides requirements for obtaining a license for space resources exploration and development by private entities, as the add-on requirements for licenses under the Space Activity Act. It also provides that operators can acquire ownership of space resources by meeting certain requirements (see **4. Ownership of Extraterrestrial Resources**).

Case Law regarding Space Activity

There have not been many lawsuits regarding space activities in Japan yet. In addition, when a dispute arises, it tends to end in alternative dispute resolution or settlement in many cases. Therefore, there are not yet many case precedents publicly available in the field of space law.

2.3 Role of the State in Space Law and Regulations

Public institutions related to space policy in Japan are as follows. Essentially, the Cabinet Office plays a central role in formulating space policy, while Japan Aerospace Exploration Agency (JAXA) plays a role as a player in space activities, such as space-related research and development, launch and operation of satellites, and support for private entities participating in space activities.

Outer Space Development Strategy Headquarter

The Outer Space Development Strategy Headquarter is established in the Cabinet and is

responsible for (i) the draft of the Space Basic Plan and its implementation, and (ii) researching and deliberating key policies on space development and use, and promoting the implementation of these policies.

Cabinet Office

The Cabinet Office oversees planning, formulation, and general co-ordination of policies on space development and use. In addition, the Cabinet office is responsible for the development and operation of the Quasi-Zenith Satellite System. The Space Policy Committee is established in the Cabinet Office, which deliberates on important policies related to space development and use.

JAXA

JAXA is established as one of national research and development agencies to realise space-related policies. The Cabinet Office, Ministry of Internal Affairs and Communications (MIC), Ministry of Education, Culture, Sports, Science and Technology, and Ministry of Economy, Trade and Industry (METI) are in charge of JAXA. JAXA focuses on (i) academic research and technological development in space science, (ii) the development, launching, tracking, and operation of satellites, etc, and (iii) assisting research and development by private entities for the purpose of implementing projects utilising outer space. JAXA also focuses on research and development related to aeronautical science and technology. JAXA's medium- to long-term goals (covering a period of five to seven years) shall be decided by the competent ministers based on the Space Basic Plan. JAXA shall take necessary measures to ensure compliance with international treaties, etc, and to keep international peace, upon requests by competent ministers.

Others

In addition to the foregoing, each ministry responsible for a particular field of space policy is working on space development and use related to its scope.

2.4 Role of the State in the Licensing Process for Space Activities

In Japan, obtaining a regulatory license is required for the launch of rockets and operation of satellites. This section describes the license for operation of satellites, and the license for launching rockets is discussed in **2.6 Role of the State in the Launching Process**. Furthermore, additional procedures are required for remote sensing and exploration of space resources, which are described in **3.1 General Rules on Space Activities** and **4.2 Granting of Rights to Space Resources**, respectively.

License for Operation of Satellites under the Space Activity Act

When operating a satellite using (i) a control facility in Japan, (ii) a control facility on board a ship or aircraft of Japanese nationality or (iii) a control facility on board a satellite over which Japan has jurisdiction, it is necessary to obtain a license for each satellite from the Prime Minister under the Space Activity Act. In relation to the license, a “satellite” is defined as “an artificial object which is used by putting it on the Earth orbit or beyond the orbit, or placed on a celestial body other than the Earth”. Thus, “satellites” include not only normal satellites used on the orbit but also rovers, etc, used on celestial bodies. The operation of satellites, subject to license under the Act, means “to detect the position, attitude and condition of a satellite and to control these using a satellite control facility”. Therefore, while it is only space objects which are subject to this type of controlling that require the license, since the operation of satellites is broadly and gener-

ally defined as described above, this license is basically required when an activity using an artificial object is to be conducted in outer space.

Any person who intends to obtain the license has to submit information regarding the location of the satellite control facility, the orbit of the satellite if it is to be used on an orbit, the purposes and methods of use of the satellite, the configuration of the satellite, the details of the measures to be taken upon the termination of the control, and other plan for the operation of the satellite. The criteria for issuing licenses are stipulated in detail in the subordinate regulations, but they include, for example, whether the purposes and methods of the satellite meet the basic principles of the international treaties and the Basic Space Act, and whether the configuration and the control plan of the satellite are sufficient from the perspective of preventing pollution of outer space and ensuring safety. According to the published guidelines, the standard period required for the examination of the license application for the operation of a satellite is about 15 days to three months.

Supervision of Satellite Operators

The Prime Minister may request reports from satellite operators who obtained a license for satellite operations and inspect their offices as necessary. Furthermore, the Prime Minister may give guidance, advice and recommendations, which have no binding power, to satellite operators to the extent necessary to ensure compliance with international treaties and public safety, and may take necessary measures against a satellite operator if the satellite operator does not comply with the plan submitted at the time of obtaining the license. Through these mechanisms, satellite operators are expected to be supervised by the government.

Other Procedures regarding Satellite Operation

In addition to the above procedures under the Space Activity Act, a satellite operator is required to submit a notification to the Cabinet Office regarding the registration of a space object in accordance with the Registration Convention and related UN recommendations when a satellite is placed into or beyond orbit.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

A person who intends to install a radio station and use radio waves in Japan must obtain a license from the MIC in accordance with the Radio Act. When using radio waves for the purpose of communication with a satellite, it is necessary to obtain a license under the Radio Act for both the radio station on the ground that communicates with the satellite and the radio station on board the satellite (a “satellite station”). When a person intends to obtain a license for a satellite station, the person shall submit information of the orbit or the position, range of movement, launch schedule and period of use, etc, of the satellite.

International co-ordination of frequencies will be carried out by the MIC with the International Telecommunication Union in the process of granting the licenses above. This international co-ordination shall begin approximately two years prior to the launch of the satellite, which is a high hurdle for doing business with satellites.

The examination of granting licenses under the Radio Act includes the feasibility check of frequency allocation in order to prevent conflicts of frequencies. The MIC publishes the table of frequencies, which shows frequencies to be allo-

cated for each purpose of use, and frequencies will be allocated according to this table.

2.6 Role of the State in the Launching Process

License for Launch under the Space Activity Act

When launching satellites, etc, from (i) a facility in Japan or (ii) a facility on board a ship or aircraft of Japanese nationality, it is necessary to obtain a license from the Prime Minister in accordance with the Space Activity Act for each launch. The term “satellites, etc” means satellites and a launch vehicle of satellites, and the meaning of a “satellite” here is the same as that described in 2.4 Role of the State in the Licensing Process for Space Activities.

Any person who applies for a license has to submit information regarding the design of the rocket, the location of the launch facility, a plan showing the flight path of the rocket and measures to ensure safety, the number of satellites to be launched and purposes and methods of the satellites, etc. The criteria for issuing a license are stipulated in detail in the subordinate regulations, but they include requirements that the rocket design, flight path and launch facilities have a certain level of safety, and that the methods and purposes of satellite conform to the basic principles of the international treaties and the Basic Space Act. Under the Space Activity Act there is also a certification for launch vehicle models and conformity certification for launch facilities, simplifying the application procedures for a launch license when using a launch vehicle or a launch facility that has been pre-certified. According to published guidelines, the standard period required for the launch license application is usually four to six months, but one to three months when using a launch vehicle model that is pre-certified.

Supervision of Launch Providers

Like the case of satellite operators, there is a supervision mechanism for launch providers. The Prime Minister may request necessary reports from launch providers, persons who have obtained certification for a launch vehicle model, and persons who have obtained conformity certification for launch facilities, and may also inspect their offices. The Prime Minister may provide guidance, advice and recommendations to them, which have no binding effect, to the extent necessary to ensure compliance with international treaties and public safety, and may also take necessary measures against a relevant operator if there is a risk that the launch vehicle or launch facility will no longer meet safety standards.

JAXA's Role in Satellite Launches

JAXA also plays a role in satellite launches. JAXA not only launches satellites developed by itself, but also provides opportunities to launch small satellites developed by private companies, universities, and other research institutes into space as piggyback payloads.

2.7 Commitment to International Treaties and Multilateral Discussions

International Treaties

As described in 1.1 The New Space and Space Tech Economy, Japan has ratified or acceded to the Outer Space Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention, but has not ratified or acceded to the Moon Agreement. As for multilateral agreements, Japan has signed the International Space Station Intergovernmental Agreement (IGA) and the Memorandum of Understanding on International Space Station, and is also a signatory to the Artemis Accords.

Role in COPUOS

Japan has participated in COPUOS since its inception, and at the 60th session of the Legal Subcommittee, Professor Setsuko Aoki became the first Japanese person, and the first woman, to chair the Subcommittee.

Domestic Legal Framework to Implement International Treaties, etc

Under the Basic Space Act, Japan's space activities are to be conducted in accordance with international treaties, including those regarding the exploration and use of outer space. In addition, pursuant to Article 6 of the Outer Space Treaty, in order to ensure that domestic space activities, including those by private operators, are conducted in accordance with the provisions of the Outer Space Treaty, the Space Activity Act stipulates that the purposes and methods of use of satellites may not interfere with the implementation of international treaties regarding development and use of outer space, as a condition for issuing a license for launch or operation of satellites. This mechanism ensures private operators conduct space activities in accordance with international treaties, including the Outer Space Treaty.

Furthermore, international soft laws are also taken into account in the criteria for issuing these licenses. For example, the criteria for issuing licenses for the launch or operation of satellites require the undertaking of detailed measures to diminish space debris, based on international guidelines for the control of space debris (the relevant guideline under the Space Activity Act clearly refers to the IADC guideline as one of such guidelines). In addition, the license criteria for the operation of satellites include taking measures to prevent the deterioration of the global environment due to materials from other celestial bodies and preventing environmental

pollution of other celestial bodies, which must be in accordance with the planetary protection guidelines stipulated by COSPAR.

Rules Regarding Responsibility With the Activities of Private Entities, etc

In the event that the space activity of a private entity in Japan causes damage to a person in a foreign country, and Japan compensates the damage in response to a claim for damages from the government of the foreign country against Japan, there is no provision in Japan's space law regarding the conditions under which the Japanese government may claim for reimbursement to the domestic private entity. Even based on general laws such as the Civil Code, it is not clear what facts can satisfy the requirements for such claims for reimbursement.

2.8 Insurance and State Measures on Liability for Damages

The Space Activity Act provides for measures to secure compensation for two types of damages: "Damage Caused by Falling Rockets, etc" and "Damage Caused by Falling Satellites, etc".

Damage Caused by Falling Rockets, etc

"Damage Caused by Falling Rockets, etc" means damage to human life, body or property caused on the ground surface, water surface, or in a flying vehicle such as an aircraft in flight by the fall, collision or explosion of (i) a satellite and its launch vehicle before satellite separation and (ii) a launch vehicle after satellite separation. From the viewpoint of providing swift compensation to the victims, the Space Activity Act provides that only the launch provider is directly liable for the Damage Caused by Falling Rockets, etc. In other words, the manager of the launch facility, the manufacturer of the launch vehicle, the purchaser of the launch service, and the satellite manager are not directly liable to the third party

for such damage; provided, however, that this does not preclude the launch provider from a claim for reimbursement against these parties. The launch provider is subject to strict liability (ie, liable even without negligence) for the Damage Caused by Falling Rockets, etc.

In order to secure the financial resources to pay for such damages, the Space Activity Act provides that the launch provider must obtain insurance as well as enter into a “Compensation Contract for Damages Caused by Falling Rockets, etc” with the government for each launch in an amount determined by the ordinance as satisfactory to protect the victims in consideration of the circumstances of the launch. These measures must be in place in order to obtain a launch license. Under the Compensation Contract for Damage Caused by Falling Rockets, etc, the government will compensate for damages that are not covered by private insurance, such as damages caused by terrorism. Furthermore, as a measure of industrial support, the Space Activities Act provides that private operators may enter into an agreement with the government under which the government will compensate for damages up to JPY350 billion in the event that the amount of actual damages exceeds the amount covered by the aforementioned measures.

Damage Caused by Falling Satellites, etc

“Damage Caused by Falling Satellites, etc” means damages to human life, body or property caused on the ground surface, water surface, or in a flying vehicle such as an aircraft in flight by the fall, collision or explosion of a satellite. The liability of the Damage Caused by Falling Satellites, etc, is also a statutory liability that arises even without fault, but unlike the Damage Caused by Falling Rockets, etc, no system exists for concentration of liability. In addition,

unlike the Damage Caused by Falling Rockets, etc, there is no obligation for satellite operators to take particular measures to ensure compensation for damages, and no government compensation system exists.

Damage Caused in Outer Space

Damage caused in outer space in cases where a rocket or satellite collides with another space object in space is not included in the Damage Caused by Falling Rockets, etc, or the Damage Caused by Falling Satellites, etc, and there are no special provisions for such damage under the Space Activity Act. Therefore, there is no obligation for launch providers and satellite operators to take measures to ensure compensation for damages and there is no government compensation system for these damages. In light of the increase in the number of satellites, whether it is necessary to take measures to secure compensation for such damages in outer space is under discussion.

3. Rules Applicable to Space Operators’ Activities

3.1 General Rules on Space Activities

With respect to the licensing system for space activities in Japan, please see **2.4 Role of the State in the Licensing Process for Space Activities** for satellite management, **2.6 Role of the State in the Launching Process** for rocket launches, and **4.2 Granting of Rights to Space Resources** for the acquisition of space resources. This section describes the regulations on obtaining and utilising remote sensing data.

Remote Sensing

Summary

The Act on Ensuring Appropriate Handling of Satellite Remote Sensing Data (the “Remote

Sensing Act,” Law No 77 of 2016) sets forth (i) the system of permission for the use of satellite remote sensing instruments using radio equipment in Japan and (ii) the regulations on the provision of certain remote sensing data obtained by satellite remote sensing instruments to third parties.

Scope

While the Remote Sensing Act regulates observations on the earth’s ground or water surface, this Act does not regulate remote sensing instruments to observe outer space or celestial bodies. In addition, remote sensing data that does not reach the specified criteria of distinguishing accuracy is not subject to the Remote Sensing Act. For example, (i) raw data with the distinguishing accuracy of two metres or less for optical sensors and (ii) raw data with the distinguishing accuracy of three metres or less for SAR sensors are subject to the regulation of the Remote Sensing Act.

Obligations

Operators of remote sensing instruments must (i) obtain a certain licence and/or permission under the Remote Sensing Act in advance and (ii) comply with the following disciplines in order to obtain and maintain the said licence and/or permission:

- take measures of security control to prevent leakage, loss, or damage of remote sensing data;
- take measures of, among others, encryption to prevent access by third parties other than persons with the licences and/or permission;
- shut down the remote sensing instruments when the corresponding satellite deviates from the authorised trajectory; and
- keep records of transmission/reception to/from the remote sensing instruments and

records in the case of provision of remote sensing data to a third party.

Remote sensing data may, in principle, be distributed only among (i) persons who have obtained licence and/or permission under the Remote Sensing Act or (ii) government agencies in Japan, the United States, Canada, Germany, and France. The Prime Minister of Japan may order the prohibition of the provision of remote sensing data to third parties, otherwise normally allowed, by specifying the scope of data and the period of time. This is the Japanese version of the so-called “shutter control” by the US President by which the sale or provision of remote sensing data of a specific region may be restricted at any time by presidential decree if there is a risk of disadvantage to the country.

Tenure Security for Space Activities

In Japan, there is no regulation on the tenure security or its revocation in general. With respect to cyber security, the establishment of security measures for satellites is considered in the review process of space activity licenses under the Space Activities Act. The Ministry of Economy, Trade and Industry (METI) has published the Guidelines for Cyber Security Measures for Civil Space Systems Ver. 2.0, which is legally non-binding but expected to be complied with.

3.2 Principles of Non-interference and Prevention of Harmful Interference

In Japan, the Space Activities Act sets forth a licensing system for (i) rocket launches and (ii) satellite management. The Act requires, during the licensing review process, that the purpose and method of satellite utilisation comply with the basic principles of the Basic Space Act in Japan and the space treaties, that the following anti-collision and space debris reduction meas-

ures be taken, and that it be ensured that there is no risk of interference with public safety.

For rocket launches:

- appropriate measures to prevent debris generation in orbit; and
- appropriate measures during the rocket's orbital injection stage to prevent debris generation.

For satellite operations:

- mechanisms to prevent accidental scattering of equipment during satellite operations;
- measures to avoid collisions with other satellites; and
- debris reduction measures at the end of the mission, such as de-orbiting and re-orbiting.

Service satellites providing in-orbit services are also subject to the review described above, provided that the satellite management facility is located in Japan. Due to the inherent risk of collision associated with in-orbit services, which often involve approaching or rendezvousing with other satellites, specific licensing guidelines have been established for satellites performing such activities.

The above guidelines (i) indicate the rules of service satellites or on-orbit services using such satellites which the operators must meet, considering the following aspects, and (ii) specify the particular items that an on-orbit service provider must present to prove that these rules have been met in the event of examination for a permit to manage such a satellite:

- prevention of infringement of rights against the target;

- security of measures to be taken against the target as an on-orbit service;
- ensuring necessary information disclosure to countries and other satellite operators;
- technical requirements for the structure and management plan of the service satellite; and
- establishment of an operational system to manage the service satellite.

For example, concerning the first aspect, the operator is required to have authorisation or consent from the owner of the target satellite or the other person who has title to the target satellite to perform on-orbit services; the specific items to be presented by the operator include (i) the target satellite's registration information; (ii) an agreement between the operator and the service recipient in which the service recipient is required to represent and warrant that the service recipient has the necessary title to the target satellite; and (iii) information on the owner and/or manager of the target.

3.3 Operators' Responsibilities

Operators' General Obligations

Operators are subject to the requirements described in **3.2 Principles of Non-interference and Prevention of Harmful Interference**.

ESG Guidelines

There are no ESG guidelines for space activities in Japan.

Lunar Heritage Sites or Scientific Research Zones

Japan is a signatory to the Artemis Accord, which commits to preserving humanity's outer space heritage, including human or robotic landing sites, artifacts, spacecraft, and other evidence of activity on other celestial bodies.

Intellectual Property Rules

Japan has no specific intellectual property rules applying to space activities and assets.

Article 26 of the Japanese Patent Act provides that “[i]f specific provisions on patents are established by a treaty, those provisions prevail”. However, it has been questioned whether the IGA (Inter-Governmental Agreement) is not included in the “treaty” set forth in Article 26 of the Japanese Patent Act (unlike the Paris Agreement regarding industrial property rights and TRIPs).

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

The Space Resources Act, which came into effect in 2021, stipulates that a satellite operator who obtained a license for the exploration and development of space resources can acquire ownership of space resources mined in accordance with its project plan by possessing the space resources with the intention of owning them. The person who mined the space resources acquires the ownership of them, and it is not expected that the government or international organisations acquire the ownership of space resources. It is considered possible for the owner to trade or otherwise use the resources in the same manner as ordinary movable property, according to the provisions of the Civil Code in Japan.

The Space Resources Act clearly states that its application should not hinder the implementation of international treaties to which Japan is a party, and that it should not unjustly harm the interests of other countries in the exploration and use of outer space, and is intended to be in harmony with international treaties, including

the Outer Space Treaty. Furthermore, the Act stipulates that efforts shall be made to establish an international framework for the exploration and development of space resources, and that necessary measures shall be taken to ensure international alignment with respect to business activities related to the exploration and development of space resources.

4.2 Granting of Rights to Space Resources

Under the Space Resources Act, ownership of space resources can only be acquired by an entity that has obtained a license for the exploration and development of space resources. This license is not an independent license but is in addition to the license for the operation of satellites. When a person who intends to explore and develop space resources applies for this additional license for the operation of satellites under the Space Activity Act, the person must submit, in addition to the project plan required for normal operation of satellites, a plan describing the purpose, the period, the place and method, and other details of the activities regarding the exploration and development of space resources. In the examination of the application, the following points will be considered in addition to the points considered for the license for the operation of satellites: (i) whether the plan for the exploration and development of space resources is consistent with the basic principles of the Basic Space Act and international treaties, and (ii) whether the applicant has sufficient capability to carry out the plan. As in the case of license for the operation of satellites, license for the exploration and development of space resources is granted by the Prime Minister, but the Prime Minister has to consult with the Minister of Economy, Trade and Industry in advance as to whether the plan meets the above license criteria.

For the purpose of (i) promoting business activities related to the exploration and development of space resources under international co-operation and (ii) contributing to the prevention of conflicts related to the exploration and development of space resources, when the license for the exploration and development of space resources is granted, in principle, the name of the operator, the contents of the plan, etc., will be made public through the internet, etc.

In November 2022, ispace Inc. obtained the first license for exploration and development of space resources under the Space Resources Act, intending to collect regolith on the Moon and transferring it to NASA. Unfortunately, however, communication with the lander was lost during the landing towards the Moon surface, preventing the project from proceeding to resource collection.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

The Basic Space Act stipulates, as a basic principle, that space development and use must be conducted in consideration of its impact on the environment. The act also stipulates that it is the responsibility of the government to take necessary measures to promote space development and use in harmony with the environment, and to endeavour to ensure international co-operation for the preservation of the space environment.

The license system under the Space Activity Act is considered to ensure that space activities in Japan are appropriate from the perspective of protecting the space environment. An operator who intends to launch a satellite or operate a satellite is required to obtain the license under

the Space Activity Act, and the criteria for issuing the license include that the purposes and methods of the use of satellite to be launched or operated should not interfere with the implementation of international treaties, by which it is required that satellites used for space activities conform to the regulations for space environment protection in the international treaties, including Article 9 of the Outer Space Treaty.

Furthermore, taking measures to protect the space environment is specifically incorporated into the examination criteria for space activity licenses. For example, regarding license criteria for launch, appropriate measures should be taken to diminish on-orbit debris and the rocket booster should be removed from the protected area of the orbit. Regarding license criteria for the operation of satellites, appropriate measures should be taken:

- to diminish debris generation, such as prevention of unintentional release of objects and prevention of crushing of satellites;
- for termination; and
- to prevent global environmental deterioration due to materials originating from other celestial bodies and to prevent environmental pollution of other celestial bodies.

These debris minimisation measures and termination measures for launch vehicles and satellites are based on the COPUOS and IADC guidelines, and the measures required to prevent the deterioration of the environment of the Earth and other celestial bodies are in accordance with the planetary protection guidelines established by COSPAR. The protection of the space environment is being pursued by requiring adherence to international treaties and soft law on space environment protection as a prerequisite for participation in space activities.

5.2 Climate Change and Space Activities

For the purpose of taking necessary measures such as formulating plans for adaptation to climate change and providing information on climate change, the Climate Change Adaptation Act has been enacted in Japan. The Act stipulates that, in order to promote adaptation to climate change, the government must make efforts to promote the observation, monitoring, prediction, and assessment of climate change and its effects, as well as the development of technologies to adapt to climate change, and the “observation” is interpreted to include observations using satellite remote sensing technology.

The Space Basic Plan formulated in June 2023 based on the Space Basic Act mentions as one of the goals for the next ten years to contribute to solving global issues such as climate change, etc, and to drive the achievement of Sustainable Development Goals through methods using data from remote sensing and the Quasi-Zenith Satellite System, etc.

As an example of government efforts to tackle climate change, several earth observation satellites aimed at addressing climate change and other issues, are being operated by JAXA and other public organisations. For example, GOSAT-2, launched in 2018, which can observe global carbon dioxide, carbon monoxide, and methane, is operated to monitor long-term changes in greenhouse gases. GCOM-C, launched in 2017, is operated to improve the accuracy of future climate change predictions through long-term observations of various physical quantities that influence the Earth’s climate, such as the impact of aerosols on the amount of solar light reaching the Earth’s surface and the ability of organisms to absorb carbon dioxide.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

In principle, space activities are taxed in the same manner as normal business activities in Japan.

In general, corporate income tax (or the income tax in the case of a natural person) and the consumption tax (VAT) are imposed on space activities as described below.

Corporate Income Tax

The corporate income tax is levied on the profits (revenues less expenses) earned during the fiscal year (or the calendar year in the case of a natural person). The effective tax rate of the corporate income tax is approximately 30%.

Consumption Tax (VAT)

When goods are transferred (typically sold) or services are rendered, 10% of the consideration is charged as the consumption tax. However, it should be noted that:

- no consumption tax is imposed on export transactions; on the other hand, consumption tax is imposed on import transactions; and
- to facilitate co-operation in space activities between Japan and the USA, such as the Artemis Accord, the consumption tax on imports of goods and other items necessary for Japan-US space co-operation is exempted from taxation under Article 5 of the Framework Agreement on Space Cooperation between Japan and the USA.

Business operators may credit the consumption tax imposed on their purchase of goods or services against the consumption tax on their sales with certain conditions (as a result, busi-

ness operators pay the net tax amount to the government).

6.2 Tax Incentives for Space Investors

While not exclusive to or specifically designed for space activities, the R&D tax credit rules and open innovation tax incentives can be leveraged to encourage investment in space-related businesses. Additionally, the angel investor tax system is available for individual venture investments in this sector. However, it is important to note that these tax incentives are temporary measures.

R&D Tax Credit Rules

This R&D tax credit rules allow a company to credit a certain tax credit ratio (1% to 14%) of the amount of its expenses relating to research and development against its corporate income tax amount. Under this system, the greater the research and development amount, the higher the applicable tax credit ratio, thereby encouraging companies to increase their R&D investment. However, there is a ceiling on the amount of tax credit that can be claimed, determined by the company's corporate income tax.

Open Innovation Tax Incentives

A company may, subject to certain conditions, deduct 25% of the amount invested in start-ups from its corporate income tax (with a minimum and maximum limit). Previously, the deduction was limited to the acquisition of newly issued shares (the New Investment type), but the tax reform in 2023 made the acquisition of outstanding shares from existing investors (the M&A type) also eligible.

Angel Taxation

This programme is available only to individual investors. In general, investors can choose from

the following three types of preferential treatment.

Preference Type A

At the time of investment, the amount invested is deducted from the amount of income for the same year (up to JPY8 million or 40% of income, whichever is lower). However, since the acquisition price of the stock is reduced by the amount of deduction, the amount equivalent to the deduction is also subject to income taxation when the stock is transferred in the future. As a result, this tax incentive is no more than tax deferral.

If a loss is incurred at the time of transfer, the amount of loss can be offset against the gains arising from other stock transfers over the following three years.

Preference Type B

At the time of investment, the full amount of the investment is deducted from gains on transfers of other stocks in the same year (without an upper limit). However, since the acquisition price of the acquired stock is reduced by the amount of deduction, the amount equivalent to the deduction is also subject to income taxation when the stock is transferred in the future. As a result, this tax incentive is no more than tax deferral. Just as with Preference Type A, if a loss is incurred at the time of transfer, the amount of loss can be offset against the gains arising from other stock transfers over the following three years.

Special Type for Pre-Seed or Seed Investment

At the time of investment in companies in the pre-seed or seed stage, the amount invested is deducted from the gains on transfer of other stocks in the same year (up to JPY2 billion).

Unlike the above, the acquisition price of the stock is not reduced, so the amount of deduction is effectively tax-free.

6.3 Taxation on Sale or Transfer of Space Assets

Income Tax

As with other goods, if a profit is made on the sale of space assets, the profit is subject to income taxation; on the other hand, if a loss is incurred, the amount of income on which the income tax is imposed is reduced by the amount of loss.

Consumption Tax (VAT)

Consumption tax is imposed at 10% of the consideration for the sale of assets or other goods or provision of services in Japan.

Consumption tax is not imposed on transactions for exporting space assets. On the other hand, a consumption tax is imposed on the importation of space assets.

If the transfer of space assets is made in outer space after the launch, the consumption tax would not be imposed since the transfer of assets occurs outside of Japan.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

“New Space” as a Growing Industry

“NewSpace” – space start-ups – is a growing industry in Japan and attracting attention from both public and private sectors. The Japanese government has set an ambitious target to double the size of the private space business market from JPY4 trillion in 2020 to JPY8 trillion by early 2030s (JPY0.6 trillion in the space equipment

industry and JPY7.4 trillion in the space solutions industry).

Large investments are flowing into the Japanese space industry from domestic and overseas venture capital funds.

7.2 Finance Sources for Space Activities

Finance Sources for Space Activities

Both the private and public sectors are actively investing in space activities in Japan.

Private funds

Private funds can be categorised into equity and debt investment. Equity is a main funding resource particularly for start-ups at the early stage. Not only venture capital funds but also “sogo-shosha” (ie, Japanese trading companies) and financial institutions are important fund providers in the space business. In addition, there have been some cases where Japanese space business companies succeeded in initial public offerings and listing on stock markets. Regarding debt fundings, some late-stage start-ups have raised funds through loans from financial institutions, including the largest Japanese commercial banks.

Public funds

The Japanese government actively supports the space industry through significant subsidies, particularly to start-ups, to encourage the space industry as a growing industry. One of the main subsidies is the “Space Strategic Fund” established in 2024, which targets space business companies, start-ups, universities, and national research institutes. The government plans to allocate JPY1 trillion over the next ten years, and included JPY300 billion in the budget for FY2023. Another subsidy, focused more on start-ups generally, is the Small/Start-up Business Innovation Research Scheme (the “SBIR

Scheme”), which promotes R&D-type start-ups, including the space industry, that contribute to solving social problems.

A governmental organisation can be a player in equity investments. Equity investment in private companies by JAXA was legalised in 2021. JAXA has invested in projects, such as satellite data businesses and spaceplane developments.

Some municipal governments use the “Furusato Nozei” (hometown tax) programme to encourage the space industry in their municipals. This allows taxpayers to contribute to any municipalities (other than where they live) in return for a tax credit from income tax and residence tax, which is expected to provide additional income to sparsely populated areas. Taiki Town in Hokkaido, for example, successfully utilised this programme to crowdfund its spaceport project.

7.3 Attracting Investment for Space Activities

Reform to Attract Investment for Space Activities

The Japanese government is dedicating efforts to increase investment in start-ups, including the space industry. Prime Minister Kishida declared “the first year of start-up creation” in 2022 and various frameworks to support start-ups have been launched. Below are examples that facilitate fundraising by start-ups in various stages.

Pre-seed/seed stage

- establishment of a credit guarantee framework that does not require a personal guarantee by managers; and
- tax exemption for reinvestment in start-ups.

Early/middle stage

- expansion of investment in venture capital by public funds;

- support in research and development of deep tech;
- improving stock option regulations; and
- expansion of public procurement from start-ups.

Later stage

- promotion of M&A through the open innovation tax incentives to expand opportunities to co-operate with large companies and diversify exit strategies; and
- development of secondary markets for unlisted shares.

Separately, as a support measure specific to the space industry, the Ministry of Economy, Trade and Industry (METI) and Organization for Small and Medium Enterprises and Regional Innovation (SME Support, JAPAN) have organised annual business matching programmes for the aerospace industry since 2014.

7.4 Foreign Investment in Space Activities

FDI Regulations in Japan

Prior filing requirement

Under the Foreign Exchange and Foreign Trade Act of Japan (FEFTA), a foreign investor who intends to conduct a restricted investment is obliged to complete a prior filing with the Minister of Finance and the relevant competent national authority where a target company’s business falls under a designated business sectors.

Restricted investments subject to such prior filing requirement include:

- the acquisition of 1% or more of the shares of a listed company or one or more shares of an unlisted company;

- consent to the appointment of a foreign investor or a related person as a director or auditor; and
- a proposal for or consent to the transfer or abolition of a business in an industry that requires prior notification.

Designated business sectors subject to such prior filing requirement are categorised into two types: core designated business sectors and non-core designated business sectors. Space-related manufacture, such as a rocket development, and the relevant software development, are classified as a “core designated business sector”, to which more stringent restrictions regarding the exemption from the filing requirement apply, as explained below.

Exemption from the prior filing requirement

Exemption from the prior filing requirement may be available in certain circumstances. If the foreign investor is a foreign financial institution, the prior filing requirement is fully waived. If the foreign investor falls under a general investor or qualified sovereign wealth funds (SWF), the following rule will apply.

Non-listed targets

Where the target company is not a listed company and is in a designated business sector, the exemption is available only when the target company is in the non-core designated business sector and the foreign investor complies with all the following requirements:

- The foreign investor and its closely related person(s) will not serve as directors or audit and supervisory board members.
- The foreign investor will not propose the transfer or abolition of a business in the relevant designated business sector to the target company’s shareholders meeting.

- The foreign investor will not access sensitive confidential information relating to a business in the relevant designated business sector.

Given that emerging space business companies are usually non-listed start-ups in a core designated business sector, foreign investors interested in the Japanese space industry should note that the prior filing requirement will be applicable in most cases.

Listed targets

Where the target company is a listed company and is in a non-core designated business sector, the prior filing requirement is fully waived. Where the target company is a listed company and is in a core designated business, a foreign investor who acquires less than 10% of the issued shares of the target company is eligible for the exemption if they further comply with the following requirements: (i) they will not participate in the target company’s board meeting regarding their business; and (ii) they will not make a written proposal requesting any response from the target company with a time limit.

Sanctions

Non-compliance with the prior filing requirement (eg, closing a deal before a stipulated waiting period expires, misrepresentation in a prior filing, non-compliance with an order by the government) leads to enforcement actions to rectify the violation. Criminal charges, including fines and imprisonment, may also be imposed.

7.5 Role of Securities Markets in Space Financing

Securities Markets and Space Industry

Securities markets are key venues where later-stage start-ups raise funds from a wider range of investors. In 2023, iQPS (development and manufacture of satellite and sale of satellite

image data) and ispace (development of rovers and landers for lunar exploration) listed on the Growth Market of the Tokyo Stock Exchange (TSE). Astroscale (in-orbit servicing, including life extension and active debris removal) received approval in May 2024 to be listed on the Growth Market.

In addition, the Financial Services Agency and the TSE have made reforms to the venture funds market so that start-ups can have wider access to funding. This market was originally established in 2001 as a market for investment corporations mainly investing in unlisted venture companies. However, the excessive regulatory burden has prevented venture funds from being listed on the market. In 2023, the TSE relaxed the market rules, including the portfolio restrictions in relation to listed shares, share buybacks and disclosure obligations. Japan Growth Capital Investment Corporation invested in Astroscale and plans to apply for the TSE venture funds market in the future.

Trends and Developments

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Nagashima Ohno & Tsunematsu is an integrated full-service law firm in Japan. We have more than 600 lawyers in total and seven overseas offices, including New York. Drawing on our broad experience and expertise in space law, we provide one-stop support to both Old Space and New Space clients, covering financing, business alliances, and contract negotiations. Our expertise in various space businesses such as satellite launch services, satellite services, on-orbit services, space resource development, commercial space travel, space insurance, and

spaceports, enables us to assist our clients in the domestic and international development of these businesses. In particular, our bilingual team is highly knowledgeable about space business, international space law, space law of the USA and other countries and international transactions, has considerable experience in contract negotiations in English with overseas space-related companies and space agencies. We also assist our overseas clients in expanding their businesses in Japan.

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Growing Space Industry

The space industry is considered a growth industry in Japan and is attracting attention from both public and private sectors. The government aims to expand the market size from JPY4 trillion in 2020 to JPY8 trillion in the early 2030s (JPY600 billion in space-related manufacture and JPY7.4 trillion in the space solutions industry).

In the space industry, more than JPY100 billion in funding has been secured since 2019, with several companies successfully completing IPOs in 2023 and 2024. Below are some notable examples of such funding (excluding loans) and IPOs:

- Astroscale Holdings (in-orbit servicing, including life extension and active debris removal): JPY44.5 billion in aggregate (up to Series G funding round) and IPO on the Growth Market of the Tokyo Stock Exchange in 2024.
- ispace (development of rovers and landers for lunar exploration): JPY21.8 billion in aggregate (up to Series C funding round) and IPO on the Growth Market of the Tokyo Stock Exchange in 2023.
- Synspective (development and operation of small Synthetic Aperture Radar (SAR) sat-

ellites and solutions through satellite data analysis): JPY22.8 billion in aggregate (up to Series B funding round).

- iQPS (development and manufacture of satellite and sale of satellite image data): JPY9.2 billion (up to share allotment in March 2023) and IPO on the Growth Market of the Tokyo Stock Exchange in December 2023.

Governmental Support

The government has introduced various support measures to develop the space industry in Japan. The “Space Technology Strategy” was announced by the Cabinet Office in March 2024. It sets out a roadmap with a development timeline in relation to technology that Japan should develop across national security and private sectors. The strategy specifies technology targets in the areas of satellites, space science and exploration, space transportation and technology fields common to these three fields.

Space Strategic Funds

The “Space Strategy Fund”, the largest government-backed initiative to date in this sector, was established to achieve the Space Technology Strategy through an amendment to the Law Concerning Japan Aerospace Exploration Agency.

Under this programme, the Cabinet Office and multiple ministries have created a fund within the Japan Aerospace Exploration Agency (JAXA) to outsource certain projects and grant subsidies to private companies (including start-ups), universities and national research institutes. The fund size will be JPY1 trillion over the next ten years and JPY300 billion was approved in the FY2023 budget.

The Space Strategy Fund has issued a call for proposals across 22 diverse themes. Some projects may be subsidised up to the full amount of project costs subject to screening based on the maturity of the relevant market, the company size, the project plan, and other factors. Below are examples of the proposed themes.

- Acceleration of the construction of commercial constellation: commissions for up to seven years, with funding capped at JPY95 billion (from JPY5 billion to JPY40 billion for large companies and from JPY6.7 billion to JPY53.3 billion for SMEs and ventures per project).
- Technology development for mass production of key materials for solid-propellant motors: commissions for up to five years, with a funding cap of JPY 4.8 billion.
- Development of integrated navigation systems for space transportation systems: commissions for up to seven years, with a funding cap of JPY3.5 billion.

SBIR subsidies

The Small/Startup Business Innovation Research Scheme (“SBIR Scheme”) supports R&D-type start-ups, including those in the space industry. The scheme includes a subsidy programme to be granted to specific new technologies for which the government sets the R&D agenda based on policy needs. It provides seamless support,

from foundation study to commercialisation, consisting of Phase 1 (proof of concept (POC)/feasibility study (FS) support), Phase 2 (practical development support) and Phase 3 (large-scale technology demonstration). When a start-up that has received Phase 1 support applies for further support under Phase 2 and Phase 3, it is subject to transition screening. In 2023, the Phase 3 support under the SBIR Scheme was allocated to 16 space start-ups (up to JPY38.8 billion) whose businesses include the development of commercial rockets, the development of technologies necessary for space debris reduction and the upgrading of the satellite remote sensing business.

K Program

The government promotes the research and development of important cutting-edge technology from the economic security perspective through the “Key and Advanced Technology R&D through Cross Community Collaboration Program” (“K Program”). As the space industry is essential from the perspective of economic security in Japan, several projects have been granted support under this programme:

- the development of satellite constellation infrastructure technologies such as optical communications (JPY60 billion in total);
- the development of technologies to monitor the maritime situation using ship-oriented communication satellite constellations (JPY14.7 billion in total); and
- the development of high-sensitivity, compact, multi-wavelength infrared sensor technology (JPY5 billion in total).

JAXA investment scheme

JAXA is one of the key contributors to the Japanese space industry. It may directly invest in private companies and provide human and

technical assistance to them since the Act on Activation of the Creation of Science and Technology Innovation was revised in 2021. JAXA has invested in projects, such as the satellite data business and spaceplane development.

Recent Space Industry Market in Japan *Launch services*

Satellite launch projects have been traditionally led by JAXA in Japan. The H-IIA Launch Vehicle has been a mainstay launcher in Japan since 2001. To improve flexibility, reliability, and cost performance, JAXA with partner Japanese companies developed a new mainstay system, the H3 Launch Vehicle, in 2024.

In parallel with these developments in the public sector, Japan is actively promoting the commercialisation of transportation services using private rockets, targeting both domestic and overseas markets. The government is supporting the development of transport capacity of private rockets through the “Space Strategic Fund” and the SBIR Scheme. The private rocket industry is one of the emerging fields in Japan and there are several development plans by start-ups; for example, Kairos Rocket by Space One and Zero Rocket by Interstellar Technologies.

Spaceport

In Japan, there are currently two active space ports: SPACE PORT Kii in Wakayama and Hokkaido Spaceport in Hokkaido. Oita Prefecture also has plans to operate a horizontal launch site at Oita Airport.

Local governments are supporting spaceport projects as a means of growing the local economy and industry, such as education, research, tourism, and entertainment. For instance, Hokkaido Spaceport made use of government financial support under the rural revitalisation

programme. They also raised funds through the corporate “Furusato” (hometown) tax programme, which enables corporate taxpayers to contribute to rural areas in return for certain tax benefits.

The government is also focusing on rule-making that improves the international competitiveness of the Japanese spaceport industry. It is recognised that international harmonisation, mutual recognition, and standardisation among space regulatory authorities will be required to establish regulatory frameworks and safety standards for space transportation as well as the technical interface between rockets/satellites and spaceports.

On-orbit servicing

The Space Basic Plan published by the Japanese government in June 2023 points out that orbit congestion caused by the growing number of constellations and space debris threatens safe and sustainable use of space. The reduction and mitigation of space debris is one of the Japanese space policies to enhance space activities. The government is aiming to develop on-orbit servicing, such as the appropriate disposal of post-operation satellites, active debris removal and refuelling and fixing to extend satellite life.

Recently, the regulatory environment in relation to on-orbit servicing has developed in Japan. The government established the “Guidelines on a License to Operate a Spacecraft Performing On-Orbit Servicing” in 2021, which specified supplementary requirements applicable to on-orbit servicing. The requirements under the guidelines include (i) the purpose and method to perform the services as a legitimate business activity; (ii) the structure and management plan to ensure safety; and (iii) the establishment of an

operational system to carry out the management of the servicing satellite.

Some Japanese companies are leading space debris solutions. For example, Astroscale, a Japanese space venture company, is working on end-of-life solutions, active debris removal and satellite life extension. They launched the “End-of-Life Services by Astroscale-demonstration” (ELSA-d) and successfully completed a close-approach rendezvous operation between its two spacecrafts in orbit. In 2024, Astroscale, as a commercial partner of JAXA, developed the commercial debris inspection demonstration satellite, the Active Debris Removal by Astroscale-Japan (ADRAS-J).

Satellite remote sensing/satellite data services

Remote sensing satellites are utilised for various purposes, such as national security, weather observation, cartography, disaster observation and resource exploration. The Japanese government also aims to develop a satellite system to observe greenhouse gases and water cycles. It is estimated that the market of the satellite data utilisation business in Japan will expand to approximately JPY52.1 billion in the early 2030s for traditional usage, such as agriculture, and weather and disaster observation. If private companies can utilise satellite data for marketing or other new purposes, the market is expected to further grow to approximately JPY96.3 billion.

The government is accelerating the use of remote sensing data by both public and private sectors through granting subsidies, expanding procurement, and supporting technology development. Indeed, some emerging private companies operate satellite remote sensing and satellite data utilisation businesses. Synspec Inc. provides SAR data and remote monitoring

services to both governmental organisations and private companies worldwide, together with solution services, including disaster and flood damage assessment and offshore wind and wave observation.

Exploration of space resources

Exploration of space resources is an area where the regulatory environment is rapidly developing in Japan. The Act on the Promotion of Business Activities for the Exploration and Development of Space Resources (aka the Space Resources Act), which was enacted in 2021, legislates private ownership of space resources. In addition, the Japanese government determined under the Space Technology Strategy in 2024 that Japan should develop technology for exploration and development of lunar resources, such as regolith and water. The first licence thereunder was issued to ispace’s project in which it was planned that they would collect regolith on the lunar surface and then transfer the ownership to NASA, but the landing on the Moon was not successful and the plan was not completed.

Sub-orbital spaceflight/space trip

Sub-orbital spaceflight and space trips are expected to have a significant market size in the next decade. The government estimates that the annual market size of sub-orbital transport and space trips (including trips to a low Earth orbit) will respectively grow to around JPY5.2 trillion and JPY880 billion by 2040.

Sub-orbital spaceflight is currently exposed to regulatory uncertainty. Sub-orbital spaceflight refers to a flight that departs from the ground, ascends to an altitude of about one hundred kilometres and then returns to the ground. However, no existing legal framework regulates this business as this is out of the scope of both the Civil Aeronautics Act and the Act of Launching

of Spacecraft, etc, and Control of Spacecraft. In response to this issue, the Cabinet Office is currently discussing possible regulatory framework on sub-orbital spaceflight.

Similarly, there is no regulation specific to commercial space trips. Although the Travel Agency Act could be applicable to travel agents for space trips, this Act is promulgated assuming only travels solely on the Earth. As another legal issue, the Consumer Contract Act nullifies a provision which fully exempts a business operator from liability against its consumers, which will subject space trip operators to significant risks and hinder growth of the space trip business. However, there is currently no law that allows exceptions to this consumer rule for space trips.

The lunar economy

Humans' return to the Moon is expected to lead to the creation of more commercially oriented lunar and cislunar activities, and the Japanese government and the private sector have a strong interest in contributing to the creation of this new economy. Japan is a member of the ARTEMIS programme, and the government is actively engaged in lunar exploration initiatives. For the private sector, following assessment of lunar resources, including water, new technologies for

mining, power creation, communication, and a lunar version of the GPS system are being developed. Also, with the increase in manned lunar missions, more sophisticated transportation, food supply, lodging and mobility will be required on the Moon. In response to these, more than 100 Japanese companies have announced their interests in lunar exploration and some companies are initiating specific projects, such as the following:

- ispace is developing services to transport payloads to the Moon and has received an offer from NASA in relation to the Commercial Lunar Payload Services project.
- Mitsui Sumitomo Insurance Company created the world's first "Lunar Insurance Plan" to cover damages from launch to touchdown on the Moon. ispace became the first user of this policy and received a JPY3.8 billion insurance payout when their lunar mission failed.
- KDDI is developing positioning and communication technologies for lunar activities and aims to realise the use of mobile communications on the Moon by 2028.
- Toyota and JAXA are developing a lunar cruiser.
- Shimizu Corporation has announced their concept for a lunar base.

NORWAY

Law and Practice

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Contents

1. Global Trends p.123

1.1 The “NewSpace” and Space Tech Economy p.123

2. Existing Legal and Regulatory Framework p.124

2.1 Characteristics of the Space Industry p.124

2.2 Legal System and Sources of Space Law and Regulation p.125

2.3 Role of the State in Space Law and Regulations p.126

2.4 Role of the State in the Licensing Process for Space Activities p.126

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.126

2.6 Role of the State in the Launching Process p.127

2.7 Commitment to International Treaties and Multilateral Discussions p.127

2.8 Insurance and State Measures on Liability for Damages p.127

3. Rules Applicable to Space Operators’ Activities p.128

3.1 General Rules on Space Activities p.128

3.2 Principles of Non-interference and Prevention of Harmful Interference p.128

3.3 Operators’ Responsibilities p.129

4. Ownership of Extraterrestrial Resources p.129

4.1 Nature of Space Resource Rights p.129

4.2 Granting of Rights to Space Resources p.129

5. Environmental Protection and Impact on Climate Change p.130

5.1 Environmental Protection in Space p.130

5.2 Climate Change and Space Activities p.130

6. Taxation of Space Activities p.130

6.1 Tax System for Space Activities p.130

6.2 Tax Incentives for Space Investors p.130

6.3 Taxation on Sale or Transfer of Space Assets p.130

7. Investment and Financing in Space Activities p.130

7.1 Impact of “NewSpace” p.130

7.2 Finance Sources for Space Activities p.130

7.3 Attracting Investment for Space Activities p.131

7.4 Foreign Investment in Space Activities p.131

7.5 Role of Securities Markets in Space Financing p.131

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Bull & Co Advokatfirma AS (Bull) is located in Oslo and has a total of 75 lawyers. Bull has one of Norway's best-ranked legal teams within technology, data, AI and cybersecurity. Bull's technology team is ranked in Chambers. The focus of both established and emerging NewSpace companies centres on technology. This is evident in their use of innovative technologies as a core instrument. Bull offers legal advice to NewSpace technology vendors, and advice on

Norwegian and international space law. We provide legal advice to a wide range of clients, from start-up space technology vendors obtaining satellite data for ocean and Earth exploration, to technology vendors delivering network and security services to ESA's scientists, engineers, and IT professionals, as well as tech companies developing technology to support human space exploration.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

Norway adopted a space law as early as in 1969. The Norwegian Space Act applies to the launching of objects into space. The Act also fulfil Norway’s obligations as a party to the so-called UN Outer Space Treaty (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies), which was ratified by Norway on 6 June 1969. The Norwegian Space Act is an authorisation act that gives the authorities the right to manage space activities through decisions.

On 15 January 2019, the Norwegian Ministry of Industry and Fisheries appointed a Space Act Committee, which was supposed to propose a modern and forward-looking regulation of space activities. The Ministry cited several factors necessitating this new legislation, including ensuring Norway’s compliance with international legal obligations, anticipating a significant increase in the scale and scope of Norwegian space activities, and fostering an environment conducive to economic growth and business development within the space sector.

On 6 February 2020, the Space Act Committee submitted their report, including the proposed new Space Act, intended to replace the existing Space Act. The proposal has several features in common with other Norwegian laws that require permission to carry out risky activities and is supposed to ensure responsible management of the risks associated with space activities. The proposed act attempts to balance the consideration of the public’s need for governance and the private sector’s need for predictability and clearly defined rules for government inter-

vention. The report has been subject to public consultation, and the Ministry of Industry and Fisheries is now working on a final draft of the new Space Act. The responsible Ministry has stated that the bill will be presented to the Norwegian Parliament during the autumn of 2024, and hopefully processed by the Parliament during the spring of 2025.

There is considerable regulation of space activities, mainly by UN bodies. Norway has acceded to four of the UN’s five space treaties. The legal landscape is also affected by intergovernmental and non-binding guidelines.

The UN Outer Space Treaty is the most important treaty on activities in outer space and is ratified by all countries with significant activity in space. The treaty contains basic principles for activities in outer space, including rules on jurisdiction. The purpose of the treaty is that the exploitation and use of outer space must “be carried out for the benefit and interest of all countries, irrespective of their economic or scientific development” (cf. Article 1(1)). An essential obligation under the treaty is the obligation to require approval and to carry out continuous supervision of non-governmental space activities.

Norway is also party to the Agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space (the “Rescue Agreement”). The Rescue Agreement obliges the parties to assist in rescue operations under certain conditions. Furthermore, the agreement regulates obligations to return astronauts and space object if these land on the territory of another country. The Agreement has no significance for Norwegian national laws.

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The Convention on international liability for damage caused by space objects (the “Liability Convention”), ratified by Norway in 1995, gives rules on liability to ensure coverage for damages that occur because of space activities. The parties to the treaty are liable for compensation to other countries for their own actions and actions carried out by private actors. Although the treaty does not oblige the treaty parties to implement specific forms of compensation rules in their national laws, the Space Act Committee intends to incorporate such rules into the Norwegian Space Act.

The Convention on registration of objects launched into outer space (the “Registration Convention”) was ratified by Norway on 28 June 1995. The convention provides more detailed rules on the registration of space objects.

The Norwegian ratification of the Rescue Agreement, Liability Convention and Registration Convention did not entail revisions to the Norwegian Space Act of 1969.

Norway is not party to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the “Moon Treaty”). The Space Act Committee nevertheless considers that the Moon Treaty would not have impacted the proposed new Space Act.

Norway has also entered into several other multilateral and bilateral agreements. Of importance is Norway’s co-operation with the European Space Agency (ESA).

Finally, Norwegian space law is affected by non-binding instruments, such as resolutions from the UN General Assembly, decisions from COP-UOUS (the Committee on the Peaceful Uses of Outer Space, set up by the General Assembly

in 1959) and recommendations from the International Law Association. Although compliance with these instruments is voluntary, it is expected that Norwegian authorities will strive to adhere to them. The Space Act Committee assumes that compliance with non-binding guidelines and recommendations is in the interests of the Norwegian authorities.

Norway is also a party to the EEA Agreement, which makes Norway part of the EU’s internal market. Although the EU does not have the competence to harmonise national space law, EU law will, depending on the circumstances, have an impact on national space law, considering that the four freedoms place restrictions on authorities’ ability to interfere with economic activity.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The Norwegian space industry has undergone significant changes since the adoption of the Norwegian Space Act in 1969. When the Act was passed, it was essentially a state-run business. The Norwegian Space Act was, despite its general wording, intended to regulate, in particular, the launching of probe rockets from Andøya in Nordland County, Norway. The activities at Andøya kicked off the Norwegian space activities in 1962, under the control of the Norwegian Defense Research Establishment (FFI). These activities led to Norway adopting one of the world’s first Space Acts.

FFI and several universities participated in research with probe rockets and balloons, and Norwegian research environments were, on the basis of their experience with probe rockets, involved in Europe’s first research satel-

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lites. However, Norwegian participation ended because Norway was not yet a member of the ESA. This, and the increased need for access to earth observation information, was among the reasons Norway became a member of the ESA in 1987. The Norwegian Space Agency was established at the same time. The Norwegian Space Agency is actively participating in ESA initiatives, EU programmes, and has overseen our membership of the ESA since we became members.

Norwegian participation in the ESA, EUMETSAT3 (European operational satellite agency for monitoring weather, climate and the environment) and in the EU's space programmes continues to be central to national industrial space investment. The Norwegian authorities have strengthened the public investment over time, not only through participation in these programmes, but also through national programmes. Most important are the investments in Space Norway AS to create a communication system in the Arctic.

Today there are several Norwegian private companies providing services to the space industry, such as technology providers and service providers. Telenor ASA, a Norwegian-listed telecommunications company in which the Norwegian state has a 54% stake through the Ministry of Industry and Fisheries, acquired its first satellite in 1992. Telenor is now a significant international service provider.

The developments in Norwegian space activity continue at an increasing pace. The private actors in the space industry have a turnover of almost NOK8 billion a year, and there is a great variation in the services and products provided. Within this industry there are several different types of companies, which deliver very different services and products. The industry organi-

sation NIFRO (The Norwegian Industrial Forum for Space Activities) has members within very diverse industries, including telecommunications, satellite components and sub-systems, propulsion and the development of probe rockets, satellite development, launch facilities for probe rocket and balloon operations, ground stations and systems for satellite communication and operation, space science, space education and other services to the space sector.

The Norwegian space industry is partially funded and operated by the state, with space-related expenditures constituting a distinct line item in the national budget. The majority of the funds are allocated towards financing Norway's participation in international space programmes, as well as the operation of the Norwegian Space Center and certain national investments. In addition, the state controls three executive bodies within space activities, namely the Norwegian Space Agency, Space Norway and has 90% ownership in Andøya Space Center AS. The Norwegian Space Agency manages the state's investment funds and advises the state, Space Norway develops space infrastructure to meet society's needs, while Andøya Space Center serves customers who wish to launch probe rockets. Notably, as of 15 May 2024, Andøya Space Center is preparing for the first-ever launch of vehicles capable of placing satellites in orbit from Norwegian soil.

2.2 Legal System and Sources of Space Law and Regulation

Norwegian law is based on a civil law tradition. Thus, the majority of the relevant rules are adopted by the Norwegian Parliament (*Stortinget*). However, the authority to adopt rules can be delegated to administrative bodies, which is the case for both the existing and proposed Space Act. Furthermore, Norway's membership of the

EEA and obligations under international law will, depending on the circumstances, involve obligations to implement international rules in Norwegian law. For more detailed information, see **1.1 The New Space and Space Tech Economy**.

The Ministry of Industry and Fisheries is currently drafting a new Space Act to be presented to the Norwegian Parliament during the autumn of 2024.

To date, there is no relevant case law related to space law in Norway.

2.3 Role of the State in Space Law and Regulations

The Norwegian space industry started as a state-run business and, for a number of years, was characterised by government initiatives and governance. Today, however, private actors in the space industry have a turnover of almost NOK8 billion a year, providing a large range of services and products. A significant portion of space activity is still state funded, and the majority of the funding goes towards financing Norway's participation in international space programmes.

In addition, the state controls three executive bodies within space activities, namely the Norwegian Space Agency, Space Norway and has 90% ownership in Andøya Space Center AS. The Norwegian Space Agency manages the state's investment funds and advises the state, Space Norway develops space infrastructure to meet society's needs, while Andøya Space Center serves customers who wish to launch probe rockets.

Even though the Norwegian authorities have adopted little legislation in the area of the space industry so far, new legislative work is now

underway (see **1.1 The New Space and Space Tech Economy**).

The Norwegian Ministry of Industry and Fisheries has sectoral responsibility for the space industry. The Ministry has sectoral responsibility for space operations and has agency responsibility for the Norwegian Space Center and Norwegian nuclear decommissioning. The Ministry is also responsible for corporate governance of the state's ownership in Andøya Space AS and Space Norway AS, as well as for space co-operation in the European Space Agency, the EU and the UN.

Thus, the Norwegian state acts as both regulator, participant and facilitator.

2.4 Role of the State in the Licensing Process for Space Activities

The Norwegian Space Act is an authorisation act that gives the authorities (the Ministry of Industry and Fisheries) the right to manage space activities through decisions. The Act states that it is illegal to launch objects into space from Norwegian territory, from Norwegian vessels or by Norwegian citizens or people resident in Norway on territory not subject to any state power, unless permission has been granted by the Ministry. The law does not say anything about when, and possibly under what conditions, such permits shall be granted.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

The Norwegian Communications Authority (*Nasjonal kommunikasjonsmyndighet*, NKOM) is responsible for the management of radio frequencies in Norway. The management consists of planning, allocation, guidance and supervision. NKOM collaborates with the International

Telecommunication Union (ITU), a special body for information and communication technology under the UN, and participates in the ITU Radio-communication Sector (ITU-R). ITU-R is responsible for global regulation of the frequency spectrum and satellite orbits. The basis for ITU-R is the Radio Regulations, an international agreement on how frequency use should be organised at national borders to avoid interference. In Europe, European countries co-operate through CEPT (European Conference of Postal and Telecommunications Administrations).

NKOM does not have its own dispute resolution service but will in practice resolve conflicts through its administrative function.

2.6 Role of the State in the Launching Process

Norway acts both as a facilitator through its control function (granting permits), and as a provider through Andøya Space Center.

2.7 Commitment to International Treaties and Multilateral Discussions

Norway is a party to the UN Outer Space Treaty, the Agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space (the “Rescue Agreement”), the Convention on international liability for damage caused by space objects (the “Liability Convention”) and the Convention on registration of objects launched into outer space (the “Registration Convention”). Norway is not party to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the “Moon Treaty”).

Norway has been a member of the Committee on the Peaceful Uses of Outer Space since 2017.

The Space Act Committee assumes that Norwegian authorities will strive to comply with non-binding legal instruments, although compliance is voluntary. Non-binding instruments have had a significant influence on the proposed new Space Act.

2.8 Insurance and State Measures on Liability for Damages

The current Norwegian Space Act has no rules on liability and insurance. In contrast, Section 6-7 of the Electronic Communications Act contains a basis for recourse from the state. In the absence of special rules, the general tort law rules in Norway will apply. This includes Section 2-1 of the Norwegian Compensation Act, which states that employers are liable for intentional and negligent damage to their employees. Furthermore, there is a non-statutory objective (strict) liability for “dangerous business”.

Norway is, however, a party to the Convention on international liability for damage caused by space objects (Liability Convention). The convention gives rules on liability to ensure coverage for damages that occur due to space activities. The parties to the treaty are liable for compensation to other countries for their own actions and actions carried out by private actors. Although the treaty does not oblige the treaty parties to implement specific forms of compensation rules in their national laws, the Space Act Committee intends to incorporate such rules into the Norwegian Space Act.

The Space Act Committee has proposed that the new Space Act state that there is an objective (strict) responsibility for the operator according to the model of the Liability Convention. Furthermore, the Committee suggests recourse liability for the operator if the state has to pay under the Liability Convention, but that both liability for

damages and liability for recourse are limited. In addition, the Committee suggests a duty for the operator to take out insurance or provide other security for liability.

The exact content of the rules will have to be determined by the Parliament when considering the bill, which, as of May 2024, is being prepared by the Ministry of Industry and Fisheries.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities

There are no specific rules, including limitations, on certain space activities.

Norway's obligations under international law require only limited implementation of specific rules, and the Norwegian Space Act is very short and concise. The Act consists of only three sections and is an authorisation act that gives the authorities (the Ministry of Industry and Fisheries) the right to manage space activities through decisions.

Section one states that it is illegal to launch objects into space from Norwegian territory, from Norwegian vessels or by Norwegian citizens or people resident in Norway on territory not subject to any state power, unless permission has been granted by the Ministry. The law does not say anything about when, and possibly under what conditions, such permits shall be granted.

Furthermore, the Space Act gives the Ministry the authorisation to give more detailed regulations, which they have done.

Regulations on earth stations for satellites in Svalbard and Regulations on earth stations for

satellites in Antarctica state that establishment, operation and use of an earth station that sends data to or receives data from a satellite requires permission from NKOM. Further, the regulation states that it is not permitted to use an earth station to send data to or read data from a satellite that performs functions specifically for military purposes, with the exception of assistance to a satellite in an emergency. The holder of a permit to establish, operate and use an earth station with a movable antenna must continuously log all satellite passes where an earth station sends data to or reads data from a satellite and store all relevant data about the antenna control orders at the same level as the logging.

Further, it can be assumed that Norwegian space activity will be regulated by the Norwegian Digital Security Act, which implements the NIS1 directive. The Act is, amongst other things, supposed to counteract unwanted incidents in network and information systems that are used to deliver socially important services and digital services. It was announced in December 2023, and will enter into force in 2024. NIS2, an updated version of the NIS1 directive, was adopted on 14 December 2022, and must be implemented by EU member states by 24 October 2024. The NIS2 directive categorises space activities as "high risk".

In addition, the Norwegian Space Center and Space Norway are subject to the National Security Act, which is designed to prevent, uncover and counter activities that threaten national security interests.

3.2 Principles of Non-interference and Prevention of Harmful Interference

The Norwegian Space Act has no rules to ensure non-interference with the activities of other space-faring entities. While international law

provides limited guidance for the legal requirements governing space activities, the Ministry or NKOM can impose conditions on permissions granted, thus controlling activities with a potential for harm. This principle is retained in the proposed new legislation.

The Space Act Committee has also proposed new rules on responsible conduct of space activities. The rule is supposed to apply as an overarching norm for operator behaviour, with the draft's specific obligations serving as case-based examples of responsible behaviour. These specific obligations clarify the overarching norm, while the norm itself implies that all parties involved in space activities are subject to legal requirements.

None of the proposed rules specifically apply to non-interference, but the principle of responsible conduct will apply as a norm, nonetheless.

3.3 Operators' Responsibilities

We refer to the description of the principle of responsible conduct in **3.2 Principles of Non-interference and Prevention of Harmful Interference**. This principle is exemplified by the proposed rules on space debris and the safeguarding of the environment.

The committee suggests that space activities should not generate more space debris than is strictly necessary. This obligation is not an absolute prohibition of space debris but sets a high threshold, emphasising that minimising space debris is critical for the sustainable use of outer space. Operators are thus required to make significant efforts to avoid leaving space debris. The committee also refers to non-binding guidelines that must be taken into account by the operator carrying out the space activity, including the Inter-Agency Space Debris Coordination Committee (IADC), UNCOPUOS Space Debris Mitigation Guidelines and Guidelines for the Long-Term Sustainability of Outer Space Activities.

Furthermore, the committee's proposal stipulates that space activity must not lead to unnecessary or unreasonable damage to the environment. This proposed duty entails that space activity must be conducted in such a way that the activity does not at any time lead to significant negative effects on the environment. The provision sets a legal standard and is a general material provision which, together with the proposed regulatory authority, allows for the creation of further provisions to ensure that space activities are carried out without unreasonable environmental damage.

There are no specific intellectual property rules applying to space activities and assets.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

Norway has no rules on the utilisation of space resources. However, Norway acknowledges the principle that space resources belong to the international community, and that there is a common right to exploit these resources based on a principle of equal treatment. The Space Act Committee has further proposed a purpose provision which stipulates that space activity must be conducted in a way that does not impair the possibility of future utilisation of outer space.

4.2 Granting of Rights to Space Resources

According to the Norwegian Space Act, the Norwegian Ministry of Industry and Fisheries has the

authority to grant permits to launch objects into space.

NKOM grants permits to establish, operate and use earth stations that send data to or receive data from a satellite on Svalbard or Antarctica.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

See 3.3 Operators' Responsibilities. There are no specific rules on protected zones or critical space minerals. However, such considerations will be taken into account when granting permits to conduct space activities.

5.2 Climate Change and Space Activities

See 3.3 Operators' Responsibilities and 5.1 Environmental Protection in Space.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

There is no applicable information in this jurisdiction.

6.2 Tax Incentives for Space Investors

There is no applicable information in this jurisdiction.

6.3 Taxation on Sale or Transfer of Space Assets

There is no applicable information in this jurisdiction.

7. Investment and Financing in Space Activities

7.1 Impact of "NewSpace"

Andøya Space Center opened its so-called Spaceport in late 2023. The Spaceport is the first of its kind in Europe and will become a commercial operator for launching small satellites. The hope is that Norway will thus become a commercial destination for the new, quickly growing space industry.

In 2022, Andøy Municipality published a preliminary study titled "Newspace North 2022". The purpose of the study was to describe possible building blocks and positioning for a Norwegian/Nordic Innovation Center at Andøya, in conjunction with Andøya Spaceport. The study analysed the possibilities and associated risks for the establishment of such a centre on Andøya, focusing on the market, competitors, location and possible partners and customers. The study also provided a recommendation for the way forward, proposing a comprehensive project plan for a preliminary project with defined main deliverables.

It concluded with a recommendation to initiate the development of a mandate for a preliminary project, with Andøy Municipality as the owner.

7.2 Finance Sources for Space Activities

The state budget has its own line item for space activities. In 2020, the line item consisted of NOK1.68 billion. Most of these funds are allocated to finance Norway's participation in international space programmes, like the European Space Agency (ESA) and EU space programmes. The funds also finance the operation of the Norwegian Space Center and some national investments in infrastructure and technology. Norway has committed to further participation in ESA's

voluntary and mandatory programmes, pledging EUR248 million over a three- to five-year period commencing in 2020.

Private actors in the space industry can apply for support through Innovation Norway, which allocates money to projects in the business world through loans, grants, consultancy, and so on. The Norwegian Space Center also distributes funds through a separate grant scheme. The ESA and the EU also have several instruments for development support.

Recent years have witnessed an increase in private initiatives and financing within the Norwegian space industry, mirroring a global trend towards supplementing public funding with private risk capital, ranging from wealthy individuals to conventional financial investors such as banks and investment funds. This influx of private investment is driven by both technological advancements and evolving policies of leading nations.

Among the most important technological changes is the emergence of small satellite technology, which lowers the threshold for entering the space market by offering smaller, lighter and cheaper satellites based on commercial components from consumer technology. Such satellites can be replaced relatively quickly at a relatively low price. This reduces the barriers for new players in the market. At the same time, there has been growth in the market for data. This enables the commercial harvesting and sale of data.

7.3 Attracting Investment for Space Activities

The Norwegian space industry has been cultivated through sustained investment from both

state and private entities. While the competitiveness of Norwegian businesses ultimately rests on their ability to leverage opportunities created by the evolving space landscape, the Norwegian authorities play an important role in ensuring a favourable environment for growth. This includes providing access to qualified labour, robust infrastructure, streamlined regulations, access to international markets, and a user-friendly policy apparatus. The Norwegian authorities also seek to facilitate private investment through public investment and public-private partnerships with an emphasis on developing new suppliers in the private sector.

7.4 Foreign Investment in Space Activities

There are no such specific rules under Norwegian law. However, actors within the space industry can be subject to the National Security Act, which applies to state, county and municipal bodies and suppliers of goods or services in connection with security-graded acquisitions. The National Security Act includes provisions on ownership control, allowing the government to intervene and prevent acquisitions of ownership stakes in covered businesses if deemed to pose a significant risk to national security interests. Furthermore, the acquisition of a qualifying share in such businesses triggers a mandatory reporting obligation.

7.5 Role of Securities Markets in Space Financing

There is no applicable information in this jurisdiction.

Trends and Developments

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Bull & Co Advokatfirma

Bull & Co Advokatfirma (Bull) is located in Oslo and has a total of 75 lawyers. Bull has one of Norway's best-ranked legal teams within technology, data, AI and cybersecurity. Bull's technology team is ranked in Chambers. The focus of both established and emerging NewSpace companies centres on technology. This is evident in their use of innovative technologies as a core instrument. Bull offers legal advice to NewSpace technology vendors, and advice on

Norwegian and international space law. We provide legal advice to a wide range of clients, from start-up space technology vendors obtaining satellite data for ocean and Earth exploration, to technology vendors delivering network and security services to ESA's scientists, engineers, and IT professionals, as well as tech companies developing technology to support human space exploration.

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NORWAY TRENDS AND DEVELOPMENTS

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The Kessler Syndrome and Norwegian Space Law Regulations on Sustainability in Space

The exponential growth in space activities has brought about significant concerns regarding the sustainability of outer space. One of the most pressing issues is the Kessler Syndrome, a scenario where the density of objects in low Earth orbit (LEO) is high enough that collisions between objects could cause a cascade, leading to an exponential increase in space debris.

Under the existing Norwegian Space Act, there are few to no specific requirements regarding sustainable use of space. The legislation lacks detailed regulation that addresses the sustainability of space activities, leaving a significant gap in ensuring that space is utilised in a manner that protects the interests of future generations.

The Norwegian space industry places a strong emphasis on space activities and sustainability. The main theme for the Space Dinner 2024, organised by NIFRO (Norwegian Industrial Forum for Space Activities), was sustainability. This event highlighted the importance of sustainable practices in the rapidly growing space industry, discussing how current and future space activities can be conducted in ways that minimise environmental impact and ensure long-term viability. The discussions and presentations aimed to align Norway's space initiatives with global sustainability goals, emphasising responsible use of space resources and the need for effective management of space debris.

This article explores the implications of the Kessler Syndrome and examines how the proposed Norwegian space law, detailed in the "Rett i Bane" report, aims to regulate space activities to ensure sustainability.

Understanding the Kessler Syndrome

There is no internationally recognised definition of the term "space debris", but it is currently used to describe human-made objects in space that are no longer functional. When these objects are no longer operational, it means they are out of service and cannot be controlled from Earth. Space debris is a significant challenge because there are limitations on the orbits around Earth that can be used for space activities. There are primarily two orbits that are attractive for satellites:

- Geostationary Orbit (GEO): This orbit is approximately 35,786 km above the Earth over the equator.
- Low Earth Orbit (LEO): This orbit ranges from 200 to 1,300 km above the Earth.

These orbits can accommodate many satellites, but as more satellites are launched, and more entities seek to place new satellites in these orbits, it has become clear that these orbits are a limited resource. Sustainability means that activities should meet current needs without compromising the ability of future generations to meet their own needs. Managing space debris is therefore closely linked to the goal of sustainable use of outer space.

The connection between sustainability and space debris lies in the fact that managing space debris is necessary to ensure the possibility of similar activities in the future. As the orbits fill with space debris, it becomes more difficult to conduct space activities in these orbits. Scientists have long been aware that too much space debris can have destructive consequences for the future use of outer space. As early as 1978, researchers began discussing the need to control objects left in space. NASA scientist Donald Kessler was the first to warn about the densi-

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fication of Earth's orbits. He was concerned that even small collisions could have significant consequences when the density of other space objects in orbit is high because a series of chain collisions could make it impossible to place satellites in the same orbit for a long time. This scenario later became known as the Kessler Syndrome, describing the situation if the challenge of space debris is not taken seriously for future use of outer space.

The purpose of regulating space debris is to reduce the number of non-functional space objects in orbit to ensure that the Earth's orbits remain available for satellite activities in the future. The space industry is evolving with an increasing number of satellites being deployed for various new purposes. Consequently, there will be more satellites in orbit now and in the future than there were previously. Therefore, it is essential to establish requirements for managing both the existing objects in orbit and those that will be launched, ensuring they are properly handled when they are no longer operational.

Current Regulation of Space Debris

Under the current Norwegian Space Act, which includes general requirements and provides the opportunity to place individual conditions in permits issued under the law, the execution of space activities is regulated to a very limited extent. Any individual conditions are tailored to the specific activities for which permission is granted.

So far, permits have only been issued for the launch of sounding rockets from Andøya and Ny-Ålesund, and the conditions in these permits are specifically adapted to these launch activities.

No Binding International Legal Obligation for Space Debris Mitigation

There is no binding international legal obligation to prevent the production of space debris, nor are there rules that sanction private entities for leaving non-functional space objects in outer space. However, as a party to the Outer Space Treaty, Norway is obligated to duly respect the interests of other states in outer space, as stipulated in Article IX. This obligation may imply certain requirements for the management of space debris.

Inter-Agency Space Debris Coordination Committee (IADC)

The IADC is an intergovernmental forum where experts from national space agencies discuss and exchange experiences. The forum was established in 1993 in response to the increased risk of collisions due to growing space activities and debris. In 2002, the IADC agreed on its guidelines. These guidelines are detailed and technical, identifying four factors that significantly impact the environmental effects of space activities:

- minimising space debris left during normal operations;
- minimising the probability of on-orbit break-ups;
- post-mission disposal; and
- prevention of on-orbit collisions.

UNCOPUOS Space Debris Mitigation Guidelines

The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is the primary UN forum for discussing space-related issues. The committee is divided into a technical and a legal subcommittee. The UNCOPUOS Space Debris Mitigation Guidelines were developed by the technical subcommittee because they

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are not intended to be legally binding. In 2007, COPUOS accepted a proposal for guidelines, which were later endorsed by the UN General Assembly in resolution 62/217. The resolution encourages UN member states to implement the guidelines in their national laws. The recommendations are based on the IADC guidelines but are less technical and detailed in form. Nevertheless, they address the same main categories of challenges as the IADC.

Guidelines for the Long-Term Sustainability of Outer Space Activities

The UNCOPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities were adopted at the UNCOPUOS's meeting in June 2019, and these guidelines contain 21 recommendations for regulating space activities. Most of these guidelines are relevant to space debris management.

National Legislative Considerations

The guidelines provide an overview of topics that legislators should consider when setting requirements for managing space debris. They do not offer detailed recommendations on how laws should be structured, and therefore leave significant discretion to national authorities. The guidelines are directed at states and concern the formulation of requirements in national legislation. These requirements are mainly framed as functional requirements, meaning they do not obligate the operator to follow a specific procedure but focus on the function or result to be achieved. As a result, there are no detailed requirements for operators in these guidelines. Detailed procedures for how operators should act can be found in other types of guidelines.

Guidelines for Space Debris Management

There are also guidelines and standards that directly target those conducting space activi-

ties – ie, standards that describe how operators must act to meet the requirements set by states. Notably, the International Organization for Standardization (ISO) has been prominent in this standardisation work. ISO is an independent, international organisation with standardisation bodies from 164 countries as members. Standard Norway is the Norwegian member organisation. ISO published a comprehensive set of standards for managing space debris in 2010, with an update in 2019. These standards build on the work done under the auspices of the UN and UNCOPUOS. ISO Standard 24113:2019 specifies general requirements and measures. These general measures are further detailed in several more specific technical standards. Developed through collaboration between leading regulatory authorities and the industry, these standards seek to balance sustainable use of outer space with cost-effectiveness and profitability in the space sector. The aim of the standard is to codify best practices within the industry, and it has been made mandatory for all space operations conducted by the ESA. The development of ISO standards indicates a significant movement towards a harmonised view not only of objectives but also of the means to manage space debris. However, ISO itself emphasises that its standards are designed to be just that – standards that can be deviated from, rather than binding rules. Thus, there is a need for caution in making these standards legally binding. Nevertheless, there is no doubt that the standards can also influence the content of more general requirements in national legislation by expressing what is accepted industry practice.

New draft Norwegian Space Act

On 6 February 2020, the Norwegian Space Act Committee submitted their proposal for a new Space Act, to replace the current Space Act. The legislative process has taken a considerable

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amount of time because numerous issues have emerged, and the world has changed significantly over the past four years. The Norwegian Ministry of Industry and Fisheries now anticipates that the Norwegian Parliament (“Stortinget”) will consider the proposed new Space Act during its autumn 2024 session, with a potential resolution expected in the spring session of 2025.

The proposal shares several characteristics with other Norwegian regulations that mandate permission for engaging in high-risk activities. It is designed to ensure the effective management of risks associated with space operations, including regulations around sustainability and environment. The draft law is based on the principle that the entity conducting space activities, referred to as the “operator”, must apply for permission and is the responsible party. With reference to Kessler Syndrome, the purpose of regulating space debris is consequently to limit the amount of non-functional space objects in outer space to ensure that orbits around Earth can continue to be used for satellite activities in the future.

The new draft includes provisions that regulate the danger of harmful space activities, space debris, and the environment.

Space Activities and the Environment

Space activities primarily take place in orbits far away (GEO), where it can be challenging to remediate any damage that occurs. Rocket launches happen near the Earth’s surface (LEO), involving significant risk of damage on the Earth. The ESA estimates that there are currently more than one million pieces of space debris larger than one cm in Earth’s orbit. Therefore, it is crucial that the law imposes necessary obligations on operators to conduct space activities in a sustainable manner.

These regulations form the subject of this article. The key question is what obligations the law should impose on operators. Under the current Norwegian Space Act, the execution of space activities is not regulated. The Norwegian Space Act is an authorisation act that gives the authorities the right to manage space activities through decisions.

The Space Act Committee’s View on Responsible Conduct in Space Activities

The Space Act Committee believes that the objective for Norway as a regulatory authority should be that space activities conducted with Norwegian permission must be carried out in a sustainable manner. This means that, as a rule, it should not be accepted that space activities leave uncontrolled space objects in orbit around the Earth. Therefore, space activities must be organised in such a way that the operator, at the conclusion of the space activity, maintains control over the space objects that will neither continue to be operated nor return to Earth.

The primary obligation of those engaging in space activities, with the operator bearing ultimate responsibility, is to ensure responsible conduct. To this end, the Space Act Committee proposes a general requirement for responsible conduct, serving as an overarching norm for how operators should act.

The specific obligations outlined in the draft can be seen as particular manifestations of what constitutes responsible conduct. These additional obligations clarify the assessment of responsible conduct, while also ensuring that the law addresses all aspects of conducting space activities.

Beyond the general requirement for responsible conduct, the draft law sets specific requirements

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for handling space debris, limiting the environmental impact of space activities, managing safety, and considering the impact of space activities on other lawful activities. These obligations directly influence how operators are obligated to conduct their space activities and form the core of the draft's regulation of space activities.

Detailed Breakdown of the Proposed Regulations

General requirement for responsible conduct

The draft Space Act introduces a general requirement for responsible conduct as an overarching principle. This principle ensures that operators consider all aspects of their activities, aiming for safe and sustainable operations. This includes:

- Risk management: Operators must identify and mitigate risks associated with their space activities.
- Sustainability: Activities must be conducted in a way that does not compromise future opportunities for similar activities.
- Transparency: Operators must maintain detailed records and report their activities to regulatory bodies.

As the requirement is formulated as a principle, the specific content will vary depending on the space activity in question and evolve in line with legal and technological developments, norms and standards. The requirements that follow from the general requirement for responsible conduct must be proportionate.

Specific obligations

The draft Space Act specifies several obligations that provide detailed guidelines for responsible conduct:

- Space debris management: Operators must implement measures to limit the creation of space debris to the amount that is strictly necessary. This includes:
 - (a) designing spacecraft to withstand the space environment and avoid fragmentation; and
 - (b) ensuring safe disposal of spacecraft at the end of their operational life.

Compliance with international guidelines and best practice standards will normally be sufficient to meet this requirement, even if the activity leaves space debris.

- Environmental impact: Operators must assess and mitigate the environmental impact of their activities, both in space and on Earth. The operator must ensure that the activity does not cause significant negative effects on the environment in all phases of the activity. This involves:
 - (a) conducting environmental assessments before launching missions; and
 - (b) implementing measures to minimise pollution and other environmental harm.

The requirement for implementing measures must be assessed proportionately based on the costs and benefits of the specific measures.

- Safety management: Operators are required to manage the safety of their missions proactively, and to maintain a high level of safety. This includes:
 - (a) establishing a risk management system and developing and maintaining safety protocols; and
 - (b) regularly reviewing and updating safety measures.
- Impact on other activities: Operators must consider how their activities affect other law-

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ful activities, both on Earth and in space, and must avoid unnecessarily or unreasonably obstructing these. This requires:

- (a) co-ordinating with other space users to avoid conflicts; and
- (b) ensuring that their activities do not interfere with other legitimate uses of space.

Alignment with international regulations

The proposed Space Act aligns with international guidelines and best practices, such as those outlined by the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and the Inter-Agency Space Debris Coordination Committee (IADC). By adhering to these standards, Norway aims to contribute to the global effort to maintain sustainable and safe space activities.

Comparison with EU Space Law

The proposed EU Space Law also emphasises sustainability and responsible conduct. It will set rules on space traffic management and provide a framework to ensure the safety of critical space infrastructure. This initiative is expected to provide a common framework for security, safety, and sustainability in space, that would ensure a consistent and EU-wide approach.

The legislative proposal for the EU Space Law has been postponed until later in 2024.

Conclusion

The proposed Norwegian Space Act represents a significant step towards ensuring the responsible and sustainable conduct of space activities by Norwegian operators. By introducing a general requirement for responsible conduct and specifying detailed obligations, the act aims to protect the space environment and ensure that future generations can continue to explore and utilise outer space. The alignment with international guidelines and the similarities with the proposed EU Space Law highlight a unified approach towards global space sustainability.



Law and Practice

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Contents

1. Global Trends p.143

1.1 The “NewSpace” and Space Tech Economy p.143

2. Existing Legal and Regulatory Framework p.144

2.1 Characteristics of the Space Industry p.144

2.2 Legal System and Sources of Space Law and Regulation p.145

2.3 Role of the State in Space Law and Regulations p.145

2.4 Role of the State in the Licensing Process for Space Activities p.146

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.149

2.6 Role of the State in the Launching Process p.149

2.7 Commitment to International Treaties and Multilateral Discussions p.150

2.8 Insurance and State Measures on Liability for Damages p.151

3. Rules Applicable to Space Operators’ Activities p.152

3.1 General Rules on Space Activities p.152

3.2 Principles of Non-interference and Prevention of Harmful Interference p.153

3.3 Operators’ Responsibilities p.154

4. Ownership of Extraterrestrial Resources p.154

4.1 Nature of Space Resource Rights p.154

4.2 Granting of Rights to Space Resources p.155

5. Environmental Protection and Impact on Climate Change p.155

5.1 Environmental Protection in Space p.155

5.2 Climate Change and Space Activities p.157

6. Taxation of Space Activities p.157

6.1 Tax System for Space Activities p.157

6.2 Tax Incentives for Space Investors p.158

6.3 Taxation on Sale or Transfer of Space Assets p.160

7. Investment and Financing in Space Activities p.161

7.1 Impact of “NewSpace” p.161

7.2 Finance Sources for Space Activities p.161

7.3 Attracting Investment for Space Activities p.162

7.4 Foreign Investment in Space Activities p.162

7.5 Role of Securities Markets in Space Financing p.163

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Vieira de Almeida & Associados is an international corporate law firm with more than 350 lawyers, and the first Portuguese law firm with a dedicated space sector practice. It also has presence in Angola, Cabo Verde, Equatorial Guinea, Guinea-Bissau, Mozambique, Sao Tome and Principe and Timor-Leste. VdA has been involved in some of the most relevant space projects in Portugal and has advised in the development of national space policies, in the drafting of guidelines for space laws and

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

The United Nations Space Treaties are the main international legal instruments applicable to space activities. They cover the Outer Space Treaty, the Rescue and Return Agreement, the Liability Convention, the Registration Convention and the Moon Agreement.

In addition to international treaties, international space law has a number of sources which include what is known as “soft law”, consisting notably of UN resolutions pertaining to the exploration and use of outer space, as well as other resolutions and codes of conduct and guidelines. These instruments, though non-legally binding, have quasi-legal effects. In space law, soft law is very important, as nowadays treaty-making has lost ground towards creating soft law instruments.

In addition to the above, the ITU Constitution, Convention and Radio Regulations address topics relating to spectrum and orbital slots, which are matters relevant for the space sector.

The EU space legal framework is also worth mentioning – notably the EU Space Programme Regulation (Regulation (EU) 2021/696), the Union Secure Connectivity Programme Regulation (Regulation (EU) 2023/588) and the envisaged EU Space Law (EUSL) on safety, resilience and sustainability of space activities.

The principles and rules of international space law have been reflected in national law by the national Space Act in 2019 (Decree-Law 16/2019), recently amended in 2024. The Space Act aims, among other purposes, to respond to the provisions of the Outer Space Treaty under

which activities of non-governmental entities in outer space shall require authorisation and continuing supervision by the appropriate State Party to the Treaty, and that State Parties are internationally liable for damages caused by a space object (a point further developed in the Liability Convention). Though international space law is not fully fit for the current new space sector marked by the privatisation and commercialisation of space activities, the national framework already contains provisions aimed to facilitate recent trends in space, including small satellites, constellations of satellites and operation of space ports. Yet, no national rules exist for other topics yet, such as suborbital flights, space mining or space tourism. For more details on the national space legal framework, see **2.4 Role of the State in the Licensing Process for Space Activities**, **2.6 Role of the State in the Launching Process** and **2.8 Insurance and State Measures on Liability for Damages**.

The topics of spectrum are reflected in national law in the Electronic Communications Law (Law 16/2022) and the framework on radioelectric licensing (Decree-Law 151-A/2000). In addition, the national frequency allocation plan contains information relating to spectrum allocation. For more details, see **2.5 Role of the State in Coordinating the Use of Radio Frequencies and Orbital Slots**.

Finally, the envisaged EUSL is expected to impact the national legal framework. However, at the time of writing, a draft has not been made available yet. As such, the potential impact of the EUSL on the national legal framework, especially with regards to potential amendments to the national Space Act, is yet to be determined.

In addition to the legal framework specifically dedicated to space activities, the space sec-

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tor is naturally also subject to a set of other relevant provisions, including on cybersecurity, sustainability, data access and sharing, personal data, cloud and platforms, contracts, consumer protection, intellectual property, artificial intelligence, imports and exports, among others. All these topics are increasingly relevant in the new space economy characterised by high technological development and downstream value-added services and products.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The Portuguese space industry is composed mostly by small and medium-sized companies particularly geared towards aerospace engineering (systems, materials, among others). This make-up is rooted also in the sector's historical genesis as an R&D sector, fostered mostly by Portugal's membership of the European Space Agency (ESA).

Nowadays, with the surge of New Space, the Portuguese space industry (or ecosystem) has seen a significant growth, taking on board not only the development of new services and products using space data, services and/or systems, but also upstream activities.

The country's investment in the sector has heavily contributed to these developments, notably through:

- the creation of a national legal framework for space activities since 2019, with the set-up of a Space Authority (currently, ANACOM, the communications regulator) tasked with licensing and supervising space activities, and the set-up of a Space Agency (Portugal Space)

tasked with fostering the development of the Portuguese space sector;

- the expansion of the country's role within ESA's projects (eg, the implementation of satellite tracking stations in the country);
- the country's betting on the development of its own space assets (among others, the development, production and launch by a private consortium helmed by Portuguese companies of Earth observation (EO) satellite constellations under the European Union's (EU) funded Recovery and Resilience Plan for Portugal, including notably the Atlantic Constellation, and the EO data platform Digital Planet; and
- the acquisition, by GeoSat, in 2021, of two EO satellites, as a result of which GeoSat has become one of the biggest EO satellite operators in Europe and the first Portuguese company to own EO satellites.

The development of launch centres and services in Portugal is further expected as a result of the recent 2024 amendment to the national Space Act establishing a framework for the licensing of space ports. This advancement follows a first tender process for the construction and operation of a space port in the Azores initiated in 2020 that was unsuccessful.

It is further expected that developments at the EU's level (or fostered through the EU's policies and programmes), in connection with its overall strategy for space and the space sector, will also contribute to the overall expansion of Portugal's space industry.

A more detailed view of the country's space industry (and overall ecosystem) is available in the country's space catalogue, published by the Portuguese Space Agency (available [here](#)).

2.2 Legal System and Sources of Space Law and Regulation

The Portuguese space legal system, which is based on civil law, comprises three main legal frameworks.

- The national Space Act, Decree-Law 16/2019, as amended by Decree-Law 20/2024 and rectified by Rectification Declaration 19/2024/1.
- The Space Regulation, Regulation 697/2019.
- The Insurance Order, Order 279/2023.

The Space Act contains the provisions for the launching and return, and the command and control, of space objects. Recent amendments integrated in the law the licensing of the operation of launch centres.

The Space Regulation contains the detailed provisions for obtaining a licence and pre-qualification for space operations. Amendments to the Space Regulation are required to align it with the recent amendments to the Space Act. At the time of writing, amendments have not been done yet.

The Insurance Order establishes the conditions for the civil liability insurance and the limits for the right of redress of the state in case of damages caused by a space operation pursued by a licensee.

The Autonomous Region of the Azores also approved a space legal framework:

- Regional Legislative Decree 9/2019/A as amended by Regional Legislative Decree 24/2021/A – Azores Regional Space Act; and
- Regional Implementing Decree 6/2020/A – Azores Space Regulation.

However, this regional framework seems to no longer apply in light of Decree-Law 20/2024 (which amended the Space Act). Indeed, this Decree-Law repealed Article 27 of the Space Act – which established, among other aspects, that the licensing procedures for space activities related to activities developed in the Autonomous Regions of the Azores and Madeira would be defined by regional legislative decree. In addition, the Decree-Law indicates, in its preamble, that “the license for launch and/or return and of command and control, this is, for accessing and using outer space, have a national scope, thus allowing its holder to perform the licensed activities from any place of the national territory, and waiving other legal titles for the same purpose”.

2.3 Role of the State in Space Law and Regulations

The Portuguese state acts as a facilitator, participant and regulator of space activities through the following main entities.

- Portugal Space, the Portuguese space agency, was set up in March 2019 under Resolution of the Council of Ministers 55/2019. It is a private, non-profit association comprising only members from the public sector. The first members were the Foundation for Science and Technology; the National Agency for Innovation; the General-Directorate for National Defence Resources, designated by the Ministry of Defence; and the regional government of the Azores, designated by the Autonomous Region of the Azores. In December 2019, the Autonomous Region of Madeira joined as an observer. Portugal Space may integrate other public entities whose activity relates to its purposes. Portugal Space is responsible for executing the Portuguese Space Policy (Portugal Space 2030) and for

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developing the national space sector. The space agency also serves as an ESA hub.

As a result of the recent 2024 amendments to the Space Act, the space agency now has a relevant intervention in the process for issuing space licences: with relation to space operations (launch and/or return, and command and control), the space agency shall issue a prior opinion relating to their licensing, and shall further, in certain circumstances, be notified of the performance of licensed space operations. With relation to launch centres, the space agency is responsible for directing the process of prior approval, by the government, of licences for the operation of launch centres, and for issuing its opinion in this scope.

- ANACOM (the communications regulator) is, temporarily, under the national Space Act, the entity competent for issuing licences and supervising space activities.
- The General-Directorate for National Defence Resources is the body responsible for managing the national SST programme and is the designated national entity in the EU SST. In this respect, a Space Surveillance and Tracking Project Group (GPSST) was set up as a temporary body for implementing national SST capabilities by Resolution of the Council of Ministers 116/2017, which addressed the participation of Portugal in the EU SST. The GPSST was originally set up for one year, but the Resolution of the Council of Ministers 113/2018 of 31 August extended its mandate until 31 December 2018. Since this date, and in accordance with this Resolution, the General-Directorate for National Defence Resources has been responsible for managing the national SST programme and will continue to do so until a new governance model is defined.

At ministerial level, and without prejudice to defence and SST matters, the competent Secretary of State for space is the Secretary of State for Science, which is, at the time of writing, within the Ministry of Education, Science and Innovation.

2.4 Role of the State in the Licensing Process for Space Activities

Space operations are subject to authorisation and may further benefit from pre-qualification. They are also subject to supervision. Registration of space objects shall further be done.

Authorisation

Space operations performed in national territory, as well as space operations performed abroad by Portuguese operators or established in Portugal, are subject to licence issued by the Space Authority.

Space operations are the following.

- Launch and/or return operations – the activity whereby space objects are intended to be sent or launched into space (below, to or beyond orbit), and the return of space objects in orbit to the Earth's surface. The launch and/or return operator performs launch and/or return operations.
- Command and control operations – the activity consisting of exercising control over a space object in outer space, whether temporarily or in transit. Where the space object cannot be controlled or guided, the command and control operation will be deemed to be the hiring of the launch or the exploitation of the space object, as notified to the Space Authority. The command and control operator performs command and/or control operations of space objects.

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There are three types of licences:

- individual licence, applicable to a single space operation;
 - blanket licence, applicable to a series of space operations of the same type or to a series of space operations of different type, performed by the same operator; and
 - joint licence, applicable to space operations of the same or different type, performed by more than one operator, situation in which the licence is granted to only one of the operators involved in the operations at stake.
- the applicant is a public entity or an international organisation acting under international agreements concluded with the Portuguese Republic;
 - the intended space operation is performed exclusively for scientific, research and development, educational or training purposes, or consists in experimental activities with demonstrable low risk for the Earth's surface, airspace and outer space, including for public health and safety of people and assets; and
 - the space operation is performed outside national territory by Portuguese operators or established in Portugal.

The joint licence can further be “integrated” (where the licence covers one launch and/or return operation of the launcher and one or more launches of space objects in that launcher, and can further cover the command and control of such objects) and “multiple” (where the licence covers a series of launch and/or return operations of the launcher(s) and one or more launches of space objects in that launcher, and can further cover the command and control of such objects).

The variety of types of licences aims to grant flexibility to space operators, allowing them to choose how best to license their space operations.

Licences are subject to the procedure defined by the Space Authority in the Space Regulation and the decision to grant a licence or not shall be issued within 90 days.

A special licensing framework, which may consist in shorter deadlines or streamlined procedures, may be established by the Space Authority, notably when:

In practice, the Space Regulation did not establish a special procedure, simply indicating that the applicant may request to the Space Authority the application of a simplified procedure and the Authority will decide within ten days, notifying the applicant of the reduced timelines or simplified procedures that will apply.

The Space Act also addresses circumstances whereby a licence for space operations has been obtained in another country. First, and in general, the special licensing procedure referred to above can be established for cases where the applicant secured authorisation for the performance of the space activity from another state whose legal framework ensures compliance with applicable international obligations. Second, space operations performed abroad may be exempted from mandatory licensing if the operator is able to demonstrate to the Space Authority's satisfaction that it secured the proper authorisations and that it abides by the law of a state with which Portugal has an agreement in place to ensure compliance with its international obligations.

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Pre-qualification

The Space Act created a specific approach under which space operators may apply to pre-qualification issued by the Space Authority, aimed at attesting:

- that the launch and/or return operator and the command and control operator have the technical, economic and financial capacity for the space activities they intend to perform;
- regarding the launch and/or return operator and the command and control operator, the features and specifications of the respective space object; and
- regarding the command and control operator, the systems and processes implemented for command and control.

The pre-qualification streamlines the process for obtaining a licence, given that it waives the submission of the information set out in the pre-qualification certificate in the licensing procedure. In accordance with the Space Regulation, the pre-qualification certificate is issued or refused within 60 days (which can be extended for additional 60 days in cases of high complexity).

Supervision

Supervision of space activities is done by the Space Authority, without prejudice to the inspection powers of other competent entities.

Operators are subject to obligations relating to the Space Authority's supervision and inspection powers, including the following:

- allowing and facilitating free access to the facilities and their annexes, as well as to their devices and instruments;

- providing all information and assistance required for the performance of the supervision and inspection; and
- maintaining in their facilities in Portugal a duly organised and updated file containing all relevant documents and records relating to the space activities they perform and to the licensing and pre-qualification procedures.

The Space Act also contains a set of provisions for incident and accident reporting, which include the obligation by operators to notify incidents occurred in their premises or in the scope of their space activity, as well as any manoeuvre, malfunction or anomaly of the space object, or other circumstances arising from or in connection with the space activity that may result in an incident or serious accident.

Infringements of the Space Act are administrative offences that may lead to the application of penalties of between EUR250 and EUR44,891.81, depending on whether the operator is a natural or a corporate person and the gravity of the offence. There are also ancillary penalties, consisting of the prohibition to perform space activities for a certain period of time and the suspension of licences.

Registration

The Space Act establishes that space objects for which Portugal is the launching state are subject to registration with the Space Authority, in accordance with Portugal's international commitments. The elements to be registered broadly correspond to those of the Registration Convention.

In addition, the Space Act also provides that the following must be registered with the Space Authority:

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- space objects whose launch, return or command and control are licensed in Portugal – the respective operator shall promote the registration;
- the transfer of ownership of any space objects whose launch, return or command and control is licensed under the Space Act – the transferor shall promote the registration;
- the end of the useful life of a space object whose operation and control is licensed in Portugal – the command and control operator shall promote registration; and
- any incident or serious accident suffered by the space object – the respective operator shall promote the registration.

The Space Regulation provides further details on registration, noting that the submission of information for registration by the operator shall be done in two days from launching or from the occurrences indicated above.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

The national framework applicable to spectrum is established in the Electronic Communications Law (Law 16/2022) and the framework on radio-electric licensing (Decree-Law 151-A/2000). In addition, the national frequency allocation plan contains information relating to spectrum allocation.

Despite the above, Portugal does not have a specific procedure for receiving requests and assisting in the ITU process for assignment of radio frequencies and orbital slots. In accordance with latest information, a specific framework for the assignment of the pre-allocated orbital slots under ITU Regulations 30, 30A and 30B (under which Portugal has two pre-allotted

orbital slots: -37.00 and -10.60) is being developed.

In any case, ANACOM, the communications regulator – which is the entity competent for radio frequencies and orbital slots – has a set of competences to manage and co-ordinate frequency allocations to avoid interferences, both at national and European levels. Notably, ANACOM is responsible for creating a specific regulatory framework for use of spectrum (which shall include the protection against harmful interference) and for co-operating with other EU member states with a view to co-ordinating the use of harmonised radio spectrum for electronic communications networks and services. As the use of radio frequencies for electronic communication networks and services depends on the attribution of a right of way, ANACOM is entitled to revoke it (or to impose changes) in case of non-compliance with the applicable obligations, which includes the obligation to adopt the technical and operational conditions necessary for the non-production of harmful interference and the protection of public health against electromagnetic fields.

2.6 Role of the State in the Launching Process

Portugal approved, under Decree-Law 20/2024, which amended the national Space Act, a specific framework for the operation of launch centres. This specific framework comprises three main topics: authorisation, pre-qualification and supervision.

Authorisation

In accordance with the Space Act, the operation of launch centres in Portugal is subject to licensing from the Space Authority.

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Prior approval is required from the members of the government responsible for the areas of defence, the sea, when the launch centre is deployed in the national maritime space, and science and technology. The aim is to ensure that national interests are respected. When the launch centre is to be installed in the Autonomous Regions of Madeira or Azores, they shall be heard and issue a binding opinion.

The Space Authority must decide on whether to issue the licence within 240 days. Licences have a maximum initial term of 15 years, with possibility of renewal.

The Space Authority shall approve, in a regulation, the proceedings for granting the licence. At the time of writing, the regulation has not been approved yet.

Pre-qualification

The Space Act provides that the launch site operator may pre-qualify that it has the technical, economic and financial capacity for the activity it intends to perform. This pre-qualification aims to streamline the process for obtaining a licence for space operations.

Supervision

Operators are subject to obligations relating to the Space Authority's supervision and inspection powers. For further details, see **2.4 Role of the State in the Licensing Process for Space Activities**.

2.7 Commitment to International Treaties and Multilateral Discussions

Portugal became a party to the UN Registration Convention in 2018 and to the Liability Convention in 2019. It had previously acceded to the Outer Space Treaty and the Agreement on the Rescue of Astronauts, the Return of Astronauts

and the Return of Objects Launched into Outer Space. It is also a signatory to the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water; the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite; and the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations.

Portugal is also a member of the Committee on the Peaceful Uses of Outer Space (COPUOS), where it has been quite active. It has, for instance, co-organised with the UN, in 2024, the Management and Sustainability of Outer Space Activities Conference, where the Lisbon Declaration on Outer Space was presented, which identifies key points for a sustainable space future.

The principles and rules of the UN Space Treaties, especially when it comes to responsibility and liability, are reflected in national law. For instance, the national Space Act provides that space operators are liable for damages caused in the performance of the space activity, as follows:

- strict liability for damages caused by the space object to the surface of the Earth or to aircraft in flight; and
- liability in the event of fault in other cases, with caps being applicable in certain cases (for more details, see **2.8 Insurance and State Measures on Liability for Damages**).

Other relevant principles and rules of international Space Law, including those on sustainability (such as the ones arising from the UN Guidelines for the Long-Term Sustainability of Outer Space – LST), are also reflected in national law – the recent 2024 amendment to the Space Act expressly mentions that the legal framework

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aims, among other objectives, to ensure that space activities are sustainable in accordance with applicable international principles, whilst debris minimisation is a condition of licence issuance (for more details, see **5.1 Environmental Protection in Space**).

2.8 Insurance and State Measures on Liability for Damages

Portuguese rules on insurance of, and liability for damages arising from, space activities follow the country's commitments as a party to the Outer Space Treaty and the Liability Convention, and account for key international concerns on the safety of space operations.

When licensing space activities, the Space Authority is required to assess the safety of those activities, notably by confirming that the envisaged activity:

- adequately safeguards potential damages to the Earth's surface, airspace and the outer space (for space operations) and the safety of the launch and/or return operations (for space ports);
- ensures that space debris are minimised to the maximum extent possible; and
- is compatible with applicable public safety rules, including those relating to public health and safety of persons and assets.

In respect of liability for damages, liability of space activities' operators is on a fault basis, except for damages caused on the Earth's surface or to aircraft in flight by a space object (strict liability). If the Portuguese Republic is held liable, pursuant to its international commitments, for any damages caused by a space object, the state has a right of recourse against the operator which is responsible for that space object, capped at the amounts defined by the Insurance

Order. The cap corresponds to the total amount of the insured capital applicable to the licensed space operation that caused the damage. The cap will not apply in certain cases, including in the event of liability for damage due to wilful misconduct or gross negligence, or if the operator fails to comply with its licensing obligations. The liability regime of the national Space Act is, of course, without prejudice to other liability regimes that are provided for under Portuguese general law (eg, in connection with environmental matters or the use of hazardous materials).

Space activities licensed under the Space Act must be insured. In particular, a civil liability insurance covering both fault-based and no-fault based liability (as previously described) arising from the space activities being carried out is a condition for the issuance (and non-revocation) of the relevant licence, and failure to do so carries additionally a fine that can top EUR44,891.81.

- Minimum insured capital – currently, the minimum insured capital is determined based on the mass of the space object, with different thresholds corresponding to different amounts of insured capital. For example, a space object with a mass equal to or less than 50 kg (minimum threshold) requires a minimum insured capital of EUR2 million, whereas a space object with a mass exceeding 500 kg (maximum threshold) requires a minimum insured capital of EUR60 million. The insured capital can also be calculated based on the maximum probable damage (as calculated by the Space Authority), if lower than the minimum insured capital required in accordance with those thresholds.

If the relevant space activities are licensed under a blanket licence, the minimum insured capital

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shall correspond to the sum of 70% of the minimum insured capital required for each of the activities benefiting from such licence. However, if the relevant space activities are licensed under a joint licence, no such reduction applies.

Note that the Insurance Order has not, at the time of writing, been revised in light of the 2024 amendment of the national Space Act, which introduced a licensing regime for space ports and amended the types of licences for space operations. With respect to space ports, though the Space Act mentions that licensed operators shall be insured (thus seemingly also including space port operators), the Insurance Order only seems to contain conditions for space operations.

- Policy exclusions and deductibles – the insurance policy exclusions are indicated in the Insurance Order. Among others, those include claims for criminal, administrative, or disciplinary liability and claims that may expose the insurer to sanctions or restrictions. Damages caused to specific individuals or groups related with the policy holder may also be excluded. In any case, the policy may provide for a deductible of up to 10% of the insured capital, which the insurer can claim solely from the policy holder.
- Time barring of policy – the insurance policy must ensure that the same covers claims for compensation submitted up to two years after its termination, provided that they are not covered by another valid subsequent insurance contract.

The requirement to be insured may be waived entirely (or the minimum insurance requirements reduced) by the Space Authority for:

- the launch, return, command and control operations of small space objects (currently defined by the Space Authority as launchers with the ability to launch a payload with a total mass of up to 50 kg, or space objects subject to command and control with a mass equal to or less than 50 kg);
- space operations carried out solely for scientific, R&D or educational and training purposes;
- space operations that carry out small risks only (as duly evidenced); or
- space activities in respect of which the operator has delivered another acceptable financial collateral that is accepted by the Space Authority.

There exists, thus, a strong concern in having leeway to ensure that procuring (and putting in place) an insurance is not detrimental to the development of the sector, in particular as regards R&D activities which are still core for several Portuguese industry players.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities

The general rules on space activities established in the national Space Act, the Space Regulation and the Insurance Order apply to all space operations and to space ports (with the particularities seen in **2.8 Insurance and State Measures on Liability for Damages** relating to insurance and the fact that the Space Regulation only covers, at the time of writing, space operations), regardless of the purpose of the space operation or the features of the space port. These rules include provisions for licensing of space activities (including conditions for licence termination), pre-qualification, registration of

space objects, transfer of space objects, liability, insurance, participation of incidents and accidents, supervision and consequences in case of breach. An important point in this respect relates with the conditions for issuing a licence, which includes, among others, compliance with public safety rules and debris minimisation. These concerns correspond broadly to what the envisaged EU Space Law (EUSL) will address, ie, safety and sustainability. However, resilience, including cyber resilience, a point to be addressed in the EUSL, is not expressly mentioned in the Portuguese legal framework for space. Yet, it is important to recall that the NIS 2 Directive (Directive (EU) 2022/2555 concerning measures for a high common level of security of network and information systems across the Union) and the CER Directive (Directive (EU) 2022/2557 on the resilience of critical entities) apply for the first time to the space sector, ie, to operators of ground-based infrastructure, owned, managed and operated by member states or by private parties, that support the provision of space-based services.

Portugal does not have specific legal frameworks for Earth Observation, suborbital flights, space mining or space tourism. Yet, with relation to suborbital flights, the development of a legal framework in this respect was announced in a September 2023 event to celebrate the 30 years of the Portuguese first satellite (PoSAT-1). Though the national Space Act can be interpreted to include suborbital flights of space objects, a dedicated set of rules would be welcome to bring more clarity to the requirements and obligations that apply to these types of flights.

3.2 Principles of Non-interference and Prevention of Harmful Interference

The Portuguese space legal framework establishes a set of conditions for issuing a licence

that aim to ensure non-interference with other space activities.

For space operations, the space operation shall be compatible with applicable public safety rules, including those relating to public health and the safety of persons and assets. What is more, other authorisations necessary for the space operation shall have been issued by the corresponding competent entities (eg, for use of airspace). The Space Regulation densifies a set of items that shall be complied with by an applicant for a licence. These include, for the launch and among others:

- the expected date and place of launch;
- planned nominal flight, including the point of flight at which the carried space object is no longer under the control of the licensee;
- the various flight stages and associated manoeuvres;
- air corridors to be used and information about the re-entry of stages;
- for the command and control of the space object in space, information to be provided by the applicant includes, among others, orbital parameters including nodal period, inclination, apogee and perigee (whether for parking, transfer or final orbit purposes) or trajectory; and
- type of command and control operations foreseeable over the operational life of the space object.

For the operation of space ports, the location intended for the launch centre, its installation, as well as its infrastructure and operation, shall ensure the safety of the launch and/or return operations and be compatible with applicable public safety rules, including those relating to public health and the safety of persons and assets. As with space operations, other neces-

sary authorisations shall have been issued by the corresponding competent entities. Further densification of these provisions is to be done by the Space Authority in regulation, which, at the time of writing, has not been approved yet.

The above provisions are without prejudice to non-interference rules arising from the communications framework (see 2.5 **Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots**).

3.3 Operators' Responsibilities

Licensed space operators are subject to a set of obligations under the national space framework.

- Launch/return and command and control operators are under the obligation to:
 - (a) comply with and abide by international principles for the use of space, notably pursuant to the space treaties binding on the Portuguese Republic, including with relation to peaceful use, safety and minimisation of space debris;
 - (b) register the space objects they launch or control, identifying the respective owner;
 - (c) take out and maintain mandatory civil liability insurance;
 - (d) duly foresee and safeguard any damages to Earth or to space, directly or indirectly, in accordance with the applicable national and international obligations; and
 - (e) comply with all legal and regulatory provisions in force, as well as with the conditions set out in the relevant licence.

They shall further, notably, report in a timely manner the occurrence of incidents and accidents, as well as keep a record of all occurrences of their activity, namely incidents and accidents, and respective investigation, mitigation or correction measures; and submit a report to

the Space Authority upon completion of each licensed space operation with the description of space activities carried out, mentioning any failures, warnings or risks identified.

- In turn, the operator of a launch centre shall abide by all legal provisions in force, as well as the conditions established in the licence. Further densification of these obligations is to be expected to be done by the Space Authority in regulation, which, at the time of writing, has not been approved yet.

A relevant point in this respect relates with compliance with ESG objectives by the space sector. In this matter, the rules applicable in Portugal derive from European Union law on ESG, with no dedicated rules or guidelines for the space sector. However, it should be noted that several activities comprised within the space operations life-cycle may be eligible under the EU Taxonomy framework (such as, for instance, data processing, hosting and related activities, the provision of IT/OT data-driven solutions, the manufacture of electric and electronic equipment, and the provision of services such as preparation for re-use of end-of-life products, including spacecraft and related machinery, where spacecraft includes, in accordance with NACE Rev 2, launch vehicles, satellites, planetary probes, orbital stations and shuttles). This therefore determines the application of several reporting obligations under the aforementioned framework.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

Portugal does not have a specific regime for space mining or space resources and is not a party to the Moon Agreement. As a State Party

to the Outer Space Treaty, it is, however, bound by the principle of non-appropriation of outer space and celestial bodies. Though the detailed interpretation of this principle by the Portuguese state and how it would apply to space mining and resources is not reflected in the national legal framework, the Lisbon Declaration on Outer Space, of May 2024, presented at the Management and Sustainability of Space Activities Conference organised by UNOOSA and the Portuguese space agency, contains a statement on space resources. Notably, it indicates that COPUOS retain a principal role as the appropriate forum to reach consensus on the use of outer space that may lead to internationally recognised governance regimes for space resources, including through the development of voluntary, non-legally binding principles and guidelines. This may point to the vision that an international framework or guidelines, instead of a national legal framework on space resources, would be the preferred course of action in the country. Though this cannot be seen as a clear conclusion of the Lisbon Declaration, or of any decision by the state in this respect, it is worth noting that there have not been discussions around the potential approval of a legal regime on space resources in Portugal at the time of writing.

4.2 Granting of Rights to Space Resources

Portugal does not have a specific regime for space mining or space resources.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

The sustainability of space activities is one of the central topics of the Portuguese space legal

framework, with the recent 2024 amendment to the Space Act expressly indicating that one of its objectives is ensuring that space activities are sustainable, in accordance with applicable international principles.

In this scope, the Space Act establishes, as a condition for obtaining a licence for space operations and as obligations of the licensee, that (i) the space operation shall duly safeguard damages to the Earth's surface, airspace and outer space, and (ii) the space operation shall ensure the minimisation of space to the maximum extent possible. The licence can foresee additional conditions, including on environmental matters. Those requirements are also reflected in the conditions for the licence for the operation of a launch centre, which, in addition, expressly indicate that the location intended for the launch centre, its installation, its infrastructures and operations, shall ensure environmental protection and waste management.

In accordance with the Space Regulation, the applicant shall submit a plan with elements attesting to the fact that the space operation under consideration guarantees the mitigation of space debris to the greatest possible extent. The space debris mitigation plan may refer to international best practices and principles, especially those provided for in the ISO 24113:2011 standard (Space systems – Space debris mitigation requirements), in the “IADC Space Debris Mitigation Guidelines” and in the “Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space”. In addition, a safety plan shall also be submitted which, among other aspects, must show that the space operation is compatible with applicable environmental rules. The Space Regulation further details the information that the safety plan shall contain, including, among others:

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- for the launch and/or return, the identification of the geographic area and risks for the environment resulting from falling elements of the space object on the Earth's surface and atmosphere and debris of products of atmospheric and extra-atmospheric combustion; and
- for the command and control operation, the risks deriving from orbital space debris caused by the space object, intentional destruction of the space object in orbit, including in case of re-entry in the atmosphere, deorbiting manoeuvres and passivation activities.

The authors note that the provisions on the Space Regulation apply only to space operations, and not to the operation of launch centres, as the Space Regulation does not, at the time of writing, reflect this topic.

Apart from the provisions for environmental protection foreseen in specific space legislation, it should be highlighted that the implementation of projects for the development of space activities may also be subject to specific licensing procedures and provisions under the general environmental legal regimes, for instance, to:

- the environmental impact assessment legal framework, established by Decree-Law 151-B/2013, as amended;
- the waste management legal framework, established by Decree-Law 102-D/2020, as amended, and the specific waste streams legal framework, established by Decree-Law 152-D/2017, as amended; and
- the environmental liability legal framework, established by Decree-Law No 147/2008, as amended.

Apart from the aforementioned general environmental legal framework that may be applicable, it is also worth noting that specific environmental principles such as prevention and precaution principles shall be considered whenever developing space activities.

Lastly, depending on the specific activity carried out, other environmental legal provisions may be applicable, notably those concerning matters of air emissions, water quality, chemicals and hazardous substances, and soil contamination.

A last brief note to refer to the recent Critical Raw Materials Regulation (Regulation (EU) 2024/1252). Among other aspects, the Regulation requires each member state to draw up a national programme for general exploration targeted at critical raw materials, and to increase their circularity. This, however, does not cover space minerals.

In accordance with the Regulation, States shall further identify the large companies that manufacture strategic technologies using strategic raw materials operating on their territory. These companies are subject to a set of obligations, including the requirement to carry out a risk assessment of their raw materials supply chain of strategic raw materials. Rocket launchers and satellites are expressly mentioned therein. The Act also makes express reference to the role of critical raw materials in the space sector. Indeed, the needs of the space sector in this regard are one of the driving forces behind the Act. In addition, the Regulation contains provisions relating to the declaration of the environmental footprint of critical raw materials (that shall be made available by those who place on the market such materials) and provisions for the recognition, by the European Commission, of certification schemes related to the sustainability of critical

raw materials (though there is no requirement for the stakeholders to resort only to certified critical raw materials).

5.2 Climate Change and Space Activities

Portugal has been committed to achieving the Sustainable Development Goals since their adoption in 2015, as well as responding to the EU climate ambitions including as arising from the European Climate Law (Regulation (EU) 2021/1119) and the EU Strategy on Adaptation to Climate Change. It is worth noting that these instruments acknowledge the role of space data to achieve their goals. In this scope, the Portuguese Framework Law on Climate (Law 98/2021), as well as the National Strategy for Adaptation to Climate Change, the National Action Programme for Climate Change Adaptation and the Strategic Framework for Climate Policy, highlight the importance of accurate information and monitoring systems, an area where space data and services can play a central role. Likewise, space data and services can give a relevant contribution to achieving the objectives of the national Roadmap for Carbon Neutrality.

Several initiatives have further been put in place to support sustainable development and climate action cross-cutting several sectors. Though none of the initiatives currently in place is specifically tailored for space activities, the involvement of the space sector may assume a relevant role, notably to support entities implementing projects in environmental fields. For instance, Earth observation data plays a relevant role to support sustainable forest management, including monitoring land use changes and managing forest health, therefore ensuring compliance with environmental regulations and certifications to maintain sustainable practices.

Additionally, from a public standpoint, space services, and, in specific, Earth observation, are also at the cornerstone of the development of the activities of several Portuguese governmental authorities for the protection of the environment, combat of climate change and promotion of sustainable development. Concretely, space data is used by entities such as the Portuguese Ministry of Environment and Energy, the Portuguese Environment Agency (APA, I.P.) or the Institute for the Conservation of Nature and Forests (ICNF, I.P.) in the performance of their duties, such as on climate monitoring and action, biodiversity conservation and management of rural fires.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

The tax system for space activities is currently not well defined or harmonised at the international level. There are no specific, common or multilateral tax rules or conventions that address the taxation of space activities.

In Portugal, the national Space Act establishes that fees and levies that may be charged by the relevant Space Authority to operators conducting space activities may be defined by Decree-Law, with a view to promoting the economic and financial sustainability of the activities of the Space Authority. A specific fee regime was also provided in the Azores space framework, which, however, seems to have been repealed (see 2.2 **Legal System and Sources of Space Law and Regulation**). At the time of writing, no fees are applied by the Space Authority.

Beyond the economic and financial regime for space activities outlined in the national Space Act, Portugal's approach to taxing space activi-

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ties does not deviate from its standard taxation system. Instead of imposing specific taxes for space activities, Portugal applies its conventional tax regime, which encompasses a broad spectrum of taxes, including those on corporate and individual income, value added tax (VAT), property tax, stamp duty, and other applicable taxes. Consequently, space activities within Portugal are subject to the same tax obligations as any other economic activity under the prevailing tax laws, depending on the nature and location of the activities and the entities involved.

Some other aspects of the Portuguese tax system may be relevant for space activities, such as the definition of tax residence or the taxation of foreign source income. Moreover, Portugal has a network of tax treaties with more than 70 countries aiming to avoid double taxation and providing for reduced withholding rates on dividends, interest and royalties paid between residents of the contracting states. However, treaties might not cover certain types of income or transactions related to space activities. Additionally, Portugal has rules implementing EU regulations on the control of exports of dual-use items, which may affect the sale or transfer of space items to other countries.

6.2 Tax Incentives for Space Investors

Portugal offers a range of tax incentives for investors in general, which may also apply to space investors, depending on the nature and characteristics of their activities and projects. Some of these incentives are the following.

- The regime of tax benefits for productive investments grants corporate income tax credits (10% to 25% of the relevant applications), exemptions from other taxes such as stamp duty, property transfer tax, municipal property tax, and simplifications of customs

procedures. This is subject to acceptance by the competent bodies, for projects that meet certain requirements and contribute to the economic development of the country. The measure also allows for additional increases, depending on the location of the project, the creation of jobs, the contribution to innovation, technology, environment, and other strategic sectors, and the exceptional relevance of the project for the national economy. However, some limitations exist, such as the minimum financial contribution of the promoters (at least 25% of the eligible costs) or non-cumulation with other tax benefits of the same nature, automatic or contractual.

- The regime of tax benefits for research and development grants a deduction from the corporate income tax payable, under certain conditions, of expenses with research and development, in the following percentages:
 - (a) 32.5% of the expenses incurred in the period;
 - (b) 50% of the increase in expenses in the period compared to the average of the previous two periods, up to the limit of EUR1.5 million; and
 - (c) an increase of 15%, in the case of micro, small or medium-sized enterprises that do not benefit from the incremental rate of 50% because they have not yet completed two periods of activity.

The measure is not applicable to R&D expenses that have been subject to state financial support on a non-repayable basis. The measure is also not cumulative, with respect to the same expenses, with tax benefits of the same nature, including contractual ones.

- The patent box regime incentivises R&D by offering tax deductions for income from certain IP rights, including patents and software

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copyrights. Companies can deduct from their taxable profit an amount tied to income from IP rights usage or temporary transfer, provided the IP is commercially used and the income is clearly recorded. The deduction is 85% of the IP income, adjusted by the ratio of qualifying R&D costs to total R&D expenses. Qualifying costs are those directly linked to R&D, excluding financial and certain real estate-related expenses. The regime also allows a 30% increase in qualifying expenses, with a cap, to boost investment in IP development and enhance innovation in the economy.

- The tax regime for amortisations and depreciations allows deductions of the costs of acquisition or production of tangible or intangible fixed assets used in the activity, according to different methods and rates.
- The participation exemption regime offers an exemption for companies deriving dividends or capital gains from certain types of equity investments. To qualify for the exemption, a company must hold at least a 10% stake in another entity for a minimum of one year, not based in a black-listed jurisdiction, not primarily involved in real estate in Portugal. The exemption applies to entities in the EU, the EEA and in countries with a tax treaty with Portugal, provided they are subject to a minimum level of taxation. The regime is designed to encourage investment and prevent double taxation, but it does not apply if the primary purpose of the arrangement is to gain a tax advantage without genuine economic substance.
- The tax regime for the scientific patronage grants deductions from taxable income for donations to entities engaged in scientific activities. Donations to public entities are considered at 130% of their value, while donations to private entities are considered at 120%. The deduction is limited to 0.8%

of the company's turnover. In-kind donations are valued at the fiscal value of the goods at the time of donation, minus any depreciations or provisions accepted for tax purposes. The benefit is subject to European rules on de minimis aid and cannot exceed the de minimis threshold. Entities receiving donations must obtain prior recognition from the Ministers of Finance and Education and Science, confirming their eligibility for scientific patronage and the scientific interest of their activities or actions.

- The tax incentive for scientific research and innovation aims to attract and retain qualified professionals engaging in teaching, research, or innovation activities that are relevant for the national economy. This measure offers a special 20% personal income tax rate on the net income from categories A and B (employment and self-employment) earned from these activities, for taxpayers who become tax residents in Portugal and have not been tax residents for any of the five previous years. The incentive is valid for ten consecutive years from the year of registration as a tax resident, and the taxpayer can choose to aggregate the income for tax purposes. To benefit from the incentive each year, the taxpayer must remain a tax resident in Portugal and continue to earn income from one of the specified activities.
- The Golden Visa regime grants a residence permit to foreign investors who make certain types of investments in Portugal, such as investing in research and development (eg, transferring capital to a public or private institution of scientific research or creating at least ten jobs in a qualifying company).
- The tax incentive for the acquisition of shares in start-ups aims to encourage investment in start-ups that are recognised as such under the legal regime in force. This measure

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reduces the taxable income from the sale or transfer of shares or similar rights in startups by 50%, as long as the investor holds the shares for at least one year. The incentive is not cumulative with other tax benefits and does not apply to investors who own more than 20% of the start-up. The incentive also requires a written confirmation from the start-up that it met the conditions for being recognised as such at the time the shares were acquired. The startup is liable for the tax due if the conditions were not met.

6.3 Taxation on Sale or Transfer of Space Assets

Space-related activities and transactions, namely with relation to assets in outer space, are not explicitly within the scope of Portuguese taxes; however, the general principles of taxation may apply to sales, transfers, and other supplies of space assets in outer space, as well as to the income derived from these activities. Moreover, it is important to note that the taxation of space-related activities is also influenced by international agreements and EU law. Portugal adheres to treaties and EU directives and regulations that may impact the taxation of space-related activities, though they are not adapted to the specificities of some of such activities and despite the lack of clarity and consensus on how to define and allocate taxing rights over them. Therefore, taxation of space-related activities relating to space assets in outer space is subject to complexity, and potential double-taxation or non-taxation, depending on the circumstances and jurisdictions involved.

For income tax purposes, Portugal generally taxes the worldwide income of its tax residents, while non-residents are taxed on their Portuguese-sourced income. If a Portuguese resident individual or a corporate entity earns

income from space assets, this income would typically be subject to Portuguese income tax, unless an exemption or relief applies. The complexity arises from determining the source of the income and the application of any relevant tax treaties that may exist between Portugal and other countries when assets are in outer space.

VAT in Portugal is applied to the supply of goods and services within the country, as well as to imports, unless an exemption or relief applies. Supplies of space assets would be subject to VAT if deemed to be supplied within the country or imported into it; otherwise, they would be outside the scope of Portuguese VAT. The taxation of services related to space assets would also be subject to VAT if these services are deemed to be supplied in Portugal. The VAT place of supply rules are thus crucial in determining whether a supply is outside or within the scope of VAT and, in the latter case, whether it is chargeable and at what rate.

In addition to the above, the transfer of space assets can impact national security due to their dual-use nature. Portugal has executed EU regulations for controlling the export of dual-use items. The export control regime requires prior export authorisation for eligible controlled products. The regime also applies to intangible technology transfers that could be used in the production of weapons of mass destruction. The export authorisation may be specific, global, union general, or national general, depending on the type and destination of the items. The validity of the export authorisation may vary from six months to four years, depending on the type of authorisation. Exporters must keep detailed records of exports, including descriptions, quantities, and end-use information. Non-compliance with the export control rules can result in criminal and administrative liability, including imprison-

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ment, fines, loss of goods, and prohibition on requesting licences or certificates. Possible impacts of export control rules on the sale and transfer of space assets and items may include:

- delays or denials in obtaining export authorisation, depending on the nature and destination of the items, the end-use and end-user, and the availability of licences or certificates;
- increased costs and administrative burdens for exporters, due to the need to comply with the export control requirements, such as filling out forms, providing documents, and keeping records;
- restrictions or prohibitions on exporting certain items or to certain countries, depending on the EU or national regulations, the international export control regimes, and the foreign policy objectives;
- risks of penalties or sanctions for non-compliance, such as imprisonment, fines, loss of goods, and prohibition on requesting licences or certificates; and
- challenges in co-ordinating with the competent authorities, especially in cases of unclear or ambiguous classification of items or data, or conflicting or overlapping regulations.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

Portugal is a somewhat new entrant to the Space sector, with New Space pushing the sector's recent boost in the country. More to the point, it is noteworthy that New Space's focus on the development of services, products and systems leveraging space assets and data allows for the evolution of new business models, with a different risk profile that are usually more attractive/accessible to non-public investors.

Indeed, Portugal has seen private funding be directed in recent years to companies that are in the space sector, even if space activities are quite marginal to their business case. With the increase of New Space outfits, the authors are now witnessing a timid interest from private players (notably, venture capital) in Portuguese outfits that have space activities as their core, even on a pre-seed phase. However, public funding still is (and is expected to remain) the key funding source for Space activities in Portugal.

7.2 Finance Sources for Space Activities

Space activities in Portugal are still mainly financed through public funding.

Indeed, key dedicated funding for Space activities derives from the following.

- The contributions that Portugal makes as a member state to ESA, under the geographical return principle (whereby amounts contributed by the member states are used by the organisation to contract outfits in those member states to carry out the development of assets, services and/or systems for ESA, roughly speaking) – in 2022 Portugal committed to fund ESA in almost EUR115 million within the next five years.
- Portugal's (EU funded) Recovery and Resilience Plan, in the context of which a key agenda concerning the space sector was awarded with more than EUR137 million (non-reimbursable) to transform the specialisation profile of the Portuguese space sector, with new innovative, exportable and more technologically complex products and services, leveraging the entire value chain. This funding, which is granted on a co-funding logic, will require the mobilisation of relevant private funds into the Portuguese space sector.

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At a much lower scale, the yearly budget of the Portuguese space agency (estimated to total around EUR9.25 million until 2027) has also been earmarked in part to fund the development of R&D space activities in the country. Also, and as an example, Portugal Ventures, a venture capital arm of the *Banco Português de Fomento* (part of the public business sector) has partnered with ESA's business incubator in Portugal (ESA BIC Portugal) to provide funding to the companies that will be incubated there.

Additionally, non-dedicated funding has been enjoyed by Portuguese companies in the space sector. Mostly consisting of public subsidies, in particular through EU structural funds and other EU programmes, but also through other public backed financing (eg, through public guarantees), non-dedicated public funding has been relevant in the funding of space activities and the space sector in Portugal.

7.3 Attracting Investment for Space Activities

Since 2019, the Portuguese state has been concerned with creating a competitive space sector in the country, being mindful of the significant benefits the sector can bring to the development of the country's economy. That goal has been, for instance, behind the manner in which space activities are regulated in the country (eg, promoting flexible licensing models and processes, assuming liability that would otherwise rest with operators, approving rules that will enable the Space Authority discretion in the implementation of national space regulations to accommodate interests of key projects and investors in the sector), as well as the creation of a Space Agency mandated to promote business and investment in the sector. Additionally, the state increased its (indirect) spending with the sector (notably, by increasing its contributions to ESA).

More recently, with the approval of space-related projects in the context of the country's Recovery and Resilience Plan, which operates on a co-funding basis, the country is aiming to increase private funding of the sector. While the public funding parcel is significant, it is expected that the success of those projects will increase sponsors' and investors' willingness (and expertise) to invest in the space sector.

Tax incentives also play a relevant role in attracting space activities to the country (see 6.2 Tax Incentives for Space Investors).

7.4 Foreign Investment in Space Activities

Foreign investment in space activities in Portugal is yet not subject to dedicated rules. However, it could still be caught under the Portuguese FDI Act (enacted by Decree-Law 138/2014 of 15 September 2014) and, accordingly, an acquisition of (direct or indirect) control over undertakings or assets could be blocked by the Portuguese Council of Ministers if:

- control is acquired by entities from non-EEA States;
- control is acquired over strategic assets (ie, the main infrastructure and assets allocated to national defence and security or to the provision of essential services in the domains of energy, transportation and communications); and
- the operation is considered to entail a plausible and sufficiently serious risk to national security or to Portugal's security of supply in essential services.

However, it is noteworthy that changes at EU level will clearly bring space activities into the scope of foreign investment screening at national level.

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The authors refer, in particular, to the proposal for a Regulation of the European Parliament and of the Council on the screening of foregoing investment in the EU, which was published on 24 January 2024 and is currently under discussion (COM (2024) 23 final). Notably, this proposal requires that all member states screen foreign investments:

- in companies that participate in projects or programmes of EU interest (including, without limitation, the EU Space Programme and Horizon Europe, which are important funding sources for space activities in Portugal); and
- in companies active (including through ownership, use, production or supply) in areas of particular security or public order interests of the EU, which include (among others) dual-use items subject to export controls, dedicated space-focused technologies, ranging from component to system level, space surveillance and Earth observation technologies, space positioning, navigation and timing (PNT), secure communications including Low Earth Orbit (LEO) connectivity, and propulsion technologies, including hypersonics and components for military use.

On a separate point, it is noteworthy the role that the Foreign Subsidies Regulation (enact-

ed by Regulation (EU) 2022/2560, already in force) may play on imposing limitations on foreign investment in space activities that is done through financial contributions to those companies. Indeed, under said Regulation, the European Commission is allowed to investigate and impose commitments or redressive measures whenever it finds that a foreign financial contribution which distorts the internal market is being made to an undertaking engaging in an economic activity in the EU.

7.5 Role of Securities Markets in Space Financing

Given the low prevalence of private funding of space activities in Portugal and the make-up of the sector consisting mostly of small and medium-sized companies, the securities markets do not play a direct role in space financing in Portugal. This is, in fact, a characteristic of the country, where the size of the commercial outfits or the nature of their shareholding structure (with clear controlling/majority shareholders) is not favourable to the development of a widespread securities market in Portugal. As such, and albeit there is strong (theoretical) potential for funding through the securities market, the maturity level of the Portuguese outfits with space activities in their core does not yet render the securities market as a real, viable funding avenue to them.

Trends and Developments

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PORTUGAL TRENDS AND DEVELOPMENTS

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Promoting the Space Sector Through the Development of Space Policies and Laws and a Unified Approach to Space Operations

Portugal has taken substantial policy, legal and institutional steps in recent years aimed at the development of its space sector.

In 2018, Portugal approved its Space Strategy – Portugal Space 2030 – by Resolution of the Council of Ministers 30/2018. The Space Strategy contains three axes: the first relates to the exploration of space data and signals through space services and applications or as enabled by space technologies. The second relates to the development, construction and operation of space equipment, systems, infrastructures and services for space data generation, with an emphasis on mini-, micro- and nano-satellites. The third axis addresses the development of national capability and skills in the space sector through scientific research, innovation, education and scientific culture.

A National Defence Strategy for Space 2020–2030 was also presented in October 2021. It addresses topics such as broadening access to space; promoting research, development and innovation; and developing capabilities in space. This Strategy also refers to the need for setting up a governance structure to ensure due co-ordination of space military matters with the Portuguese space agency and other relevant bodies.

In addition, it is worth mentioning that the Autonomous Region of the Azores also presented its Space Strategy in November 2021. The Space Strategy aims to enhance national and European space goals taking into account the specificities of the Azores region, notably its geostrategic location. In this scope, it points to several objectives, including the development of space activi-

ties in the region, research and development, and positioning the Azores as an Atlantic hub.

These three policy pillars of the Portuguese approach to space have been reflected, in general, in the institutional and legal approach to space.

Indeed, the Portuguese space agency – Portugal Space – is the entity responsible for executing Portugal Space 2030.

At the military/defence level, the Organic Law on the Organisation of the Armed Forces (Organic Law 2/2021), indicates that EMGFA (General Staff of the Armed Forces – “*Estado-Maior General das Forças Armadas*”) is responsible for planning and directing the military aspects of the national defence space programme. And the Organic Law of the General Staff of the Armed Forces (Decree-Law 19/2022), approved the establishment of the Communications and Information, Cyberspace and Space Centre (CCICE) within the General Staff of the Armed Forces. This Centre enables the joint command and control capacity of the Armed Forces, ensures the exercise of command of military operations in and through cyberspace, and directs the military aspects of the national defence space programme. In addition, the General-Directorate for National Defence Resources (DGRDN) is the body responsible for managing the national Space Surveillance and Tracking (SST) programme and is the designated national entity in the EU SST. Defence also participates in the space agency, in its defence division.

At the regional level, the Autonomous Region of the Azores has been playing a relevant role in space due to its geostrategic location. Not only the headquarters of the space agency are in the Azores, but the Azores also has a Mission

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Structure for Space (EMA-Space), competent for managing and co-ordinating all infrastructure and technical-scientific activities related with space and for ensuring the implementation of the regional space strategy.

The role of the Azores in space matters led this autonomous region to approve a specific legal framework for licensing space operations and to lead the initiative to install a spaceport in the Azores (the Azores International Satellite Launch Programme – ISLP).

The regional legal framework was developed in light of Article 27 of the Space Act, which established, among other aspects, that the licensing procedures for space activities related to activities developed in the Autonomous Regions of the Azores and Madeira would be defined by regional legislative decree. The regional framework applied to licensing, pre-qualification, registration and transfer of space objects relating to activities developed in the Azores (defined as those activities based on both offshore and onshore infrastructures or platforms, including, in this instance, the maritime areas adjoining the archipelago). However, the regional framework replicated, in practice, the provisions of the national Space Act and Regulation (Decree-Law 16/2019, and Regulation 697/2019), thus leading to a duplication of processes that operators would have to comply with to perform space activities in the Azores. For instance, it seemed that operators would have to obtain two licences: one from the national Space Authority and another one from the regional space authority (the EER). Furthermore, because both acts contain fines, operators could in theory be subject to fines twice. This duplication, and the lack of substantial co-ordination mechanisms, placed a heavy burden on operators.

Acknowledging this situation, the recent amendment to the national Space Act – Decree-Law 20/2024 – repealed Article 27 of the Space Act. It also indicates, in its preamble, that “the license for launch and/or return and of command and control, this is, for accessing and using outer space, have a national scope, thus allowing its holder to perform the licensed activities from any place of the national territory, and waiving other legal titles for the same purpose”. This seems to point to the regional framework no longer applying, a solution that better fits the goals of the Portuguese State of facilitating space activities in the country. As such, and without prejudice to the Autonomous Regions being notified of the granting of licences for launches and/or returns from their territory, there is now only a single unified approach for space operations in Portugal.

Promoting the Space Sector Through Spaceports and the Space Rider

Spaceports are ever more a key topic for the space sector. Given the technical advances on space vehicles and launching techniques, coupled with the increase in demand for commercial launches, spaceports may soon become a key infrastructure for countries with space interests.

Portugal is no stranger to this trend. Indeed, while initially the country had not opened the set up and operation of spaceports to private initiative, the Portuguese Space Act has now been amended, introducing a licensing regime for the operation of spaceports, acknowledging the private sector interest in setting up and operating private spaceports and the need to have a legal framework that accommodates the country's several layers of government (in particular, at regional level) without putting the burden of them (eg, conflicting decisions and pieces of legislation) on the spaceport's promotor.

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Such licensing regime allows for the set up and operation of any fixed or movable launching and/or landing facilities within the Portuguese territory, all irrespective of the nationality of the operator.

Licences are issued by the Space Authority for a maximum first term of 15 years (which may be renewed), subject to a prior approval from the Portuguese government.

This licence does not substitute the need to obtain all other authorisations that may be necessary to the set up and operation of the spaceport (which are a condition for the issuance of the spaceport licence – eg, building permits, environmental licences, among others); however, the Space Authority will be acting as a one stop shop (fronting the relationship with the national, regional and municipal authorities) for the entity procuring the spaceport licence in connection with all those other licences necessary to set-up and operate the spaceport. Thus, it is expected that the process can be streamlined as much as possible.

A transfer of ownership of the licence must be authorised by the Space Authority, conditional on a prior approval by the Portuguese government.

This is, indeed, a licensing regime more stringent than the one applying generally to space operations, requiring the involvement of the Portuguese government. However, this is understandable given the strategic significance of those infrastructures, but, most importantly, is also an opportunity for promoters, as they will be able to confirm early in the process of the country's interest (or not) in their project.

It is expected that, with this change, the country can benefit from its geographical position to attract private players interested in setting up and operating spaceports in the country (including the maritime space under Portugal's jurisdiction).

A special mention to ESA's Space Rider system must also be included, which aims to be a European reusable end-to-end integrated space transportation system for access and return from low orbit.

Portugal, through its Space Agency, has been heavily invested in trying to be designated as (one of the) landing site for the Space Rider system, with a feasibility study currently ongoing in connection with a site in Santa Maria Island in the Azores (one of the six places identified by ESA worldwide as a possible landing location).

With its qualification flight expected to take place in Q3 2025 and commercial operation afterwards, if Portugal is indeed chosen as the landing site, the associated infrastructures will allow for new space businesses linked with the upstream sector (in particular, the ground sector) to be developed in connection therewith, as well as the set-up of a new key business and R&D ecosystem for downstream activities.

Promoting the Space Sector Through New Space Projects

Portugal's Recovery and Resilience Plan (RRP) will be a key driver in the development of the country's space sector in the next years.

In particular, it is noteworthy that one of the projects related to the space sector funded by the RRP (New Space Portugal) will have Portuguese companies manufacturing, owning and operating upstream facilities (notably constellations of

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Earth observation satellites), while committing to the development of a whole new business and R&D ecosystem (in the downstream sector) associated to those upstream facilities and the data they collect.

Involving a significant monetary investment and a myriad of skills and know-how that the country does not currently have, this project is led by a consortium of more than 30 entities with very different backgrounds. This make-up of the consortium is expected to further contribute to the dynamism of the Portuguese space sector, acknowledging that we are dealing with a key sector to the overall economic development of the country, with impact and potential benefits to several other sectors.

To that point, given the broadness of products, services and systems that upstream space activities require (and will continue to require in the future given its nature as an eminently technological sector) and the broadness of products, services and systems that will be developed from or to further leverage space assets (including space data) the authors expect that the Portuguese space market will continue to grow, with relevant opportunities arising therefrom.

As an example, another project funded under the RRP (NeuraSpace) will focus on supporting the development of an existing space traffic management platform leveraging artificial intelligence and machine learning that was created by a Portuguese company.

But, also, the awareness (especially at EU-level) of the possibilities that space assets and technologies can bring to the table to address the challenges that the countries are facing today (eg, on climate change matters, on the energy transition, on the blue and green economies,

cybersecurity and infrastructure resilience, among others) allows for initiatives (and funding) being leveraged towards the space sector.

Accordingly, the authors' expectation is that the space sector in Portugal will take all those new opportunities to continue growing and diversifying the products and services provided, further creating new opportunities for investment and growth.

Promoting the Space Sector Through Sector-Specific Legislation

An increased number of laws, notably at EU level, is acknowledging the role that space data, products and services play across sectors.

For instance, the environmental sector is increasingly making reference to space related services (notably Earth Observation (EO) data and services), as a source of reliable and timely information for environmental monitoring, reporting and compliance. This can be seen, for instance, in the European Climate Law (Regulation (EU) 2021/1119), in the EU Strategy on Adaptation to Climate Change, in the EU Zero Action Plan, in the EU Net Zero Industry Act, in the Deforestation Regulation (Regulation (EU) 2023/1115) or in the approach proposed for a voluntary carbon market.

Likewise, some policies and laws applicable to the ocean sector acknowledge the role of space services as well, mostly for monitoring and environmental purposes. This is the case, for instance, of the EU Maritime Security Strategy and its Action Plan; the Commission Decision (EU) 2017/848, of 17 May 2017, concerning monitoring methods on the good environmental status of marine waters; and Directive 2005/35/EC on ship-source pollution.

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In turn, in the agriculture and forestry sector, the policy and legal instruments also make reference, in some cases, to space services, especially in relation to the Common Agricultural Policy (CAP) and its monitoring and control system (Regulation (EU) 2021/2116, and Commission Implementing Regulation 2022/1173). Likewise, other policies, such as the New EU Forest Strategy for 2030 and the Soil Strategy 2030, acknowledge the role of space services.

The mobility sector is also regulated by policy and legal frameworks that address, in certain cases, the use of satellite services, notably positioning, navigation, and timing (PNT) and satellite communications (SatCom) services. For instance, in the Road segment, some legislation makes express reference to satellite positioning such as for intelligent speed assistance systems (Commission Delegated Regulation (EU) 2021/1958) or for eCall (Regulation (EU) 2015/758, and Commission Delegated Regulation (EU) 2017/79).

However, despite the increased acknowledgment, as seen above (and as also reflected in policy and legislation in other sectors), many of the EU references to satellite services and data rely on the EU Space Programme, whilst other legislation, despite recognising the central role of accurate data, do not expressly refer to satellite services (this is the case, for instance, of the EU's Biodiversity Strategy for 2030 or the EU Marine Strategy Framework Directive – Directive 2008/56/EC). In other cases, though satellite services and products could play a central role in achieving the goals of legislation or ensuring compliance thereof, express references to space services are lacking. This is mostly also the case of Portugal, as can be seen, for instance, in the national Framework Law on Climate (Law 98/2021), in the National Strategy for Adaptation

to Climate Change (Resolution of the Council of Ministers 56/2015), in the Roadmap for Climate Neutrality (Resolution of the Council of Ministers 107/2019) or in the framework for voluntary carbon markets (Decree-Law 4/2024). Other policies, however, do make express references to satellite services – for instance, the National Ocean Strategy 2021–2030 (Resolution of the Council of Ministers 68/2021), the Portuguese Common Agricultural Policy Strategic Plan or the National Strategy for Forests.

There is, thus, room for improvement, including at national level, in policy and legislation areas such as air quality, water management, ecosystem conservation, organic farming, pesticide use, mobility monitoring, planning and management, among many others.

Adequate policy and legal frameworks can indeed play a very relevant role in creating awareness, by sector-specific stakeholders, of the existence of space data and services as an important instrument to meet their needs and ensure they comply with legal obligations. At the same time, sector-specific legislation can bring significant opportunities for the space sector, further encouraging and promoting the development of space services and products with different applications in different sectors, that integrate different outputs and that are further able to create opportunities with synergies that several stakeholders can take advantage of.

This approach, together with all other initiatives taken at national level to promote space activities, as seen above, contributes, thus, to further the creation of a comprehensive framework that facilitates and encourages the development of the space sector.

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Promoting the Space Sector Through Cross-Sector Legislation

Recent EU cross-sector legislation can also bring opportunities (and obligations) to the space sector. The authors highlight three main areas in this regard: data sharing, artificial intelligence and resilience.

1. Data sharing

Recent EU laws, notably the Data Governance Act (DGA) (Regulation (EU) 2022/868), and the Data Act (Regulation (EU) 2023/2854), can have a significant impact on the space sector.

- The DGA introduced measures for data sharing and re-use, and established a framework for data intermediation services, as well as data altruism organisations.
 - (a) The provisions on the re-use of certain categories of protected data held by public sector bodies are relevant as such data can include satellite data. These provisions are to be read together with the provisions on re-use of open public data, under Portuguese Law 26/2016 and Law 68/2021 (the EU legislation in this regard in the Open Data Directive – Directive (EU) 2019/1024) and the High-Value Datasets Regulation (Commission Implementing Regulation (EU) 2023/138). In this regard, high-value datasets are:
 - (i) available free of charge, except in certain limited conditions;
 - (ii) machine readable;
 - (iii) provided via APIs; and
 - (iv) provided as a bulk download, where relevant.
- The Data Act contains provisions on, among others, access and re-use of data held by private entities and on data processing services.
 - (a) The provisions on access and re-use include requirements on contractual conditions in B2B non-negotiated contracts, and obligations on B2G data sharing in case of exceptional need, as therein defined. Satellite data providers subject to the Data Act will have to comply with these obligations.
 - (b) The provisions on data processing services (such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS)) aim, notably, to allow businesses to easily switch their data and other digital assets between competing providers of such services, as this is considered a precondition for the development of the data economy.

They are further provided under harmonised re-use conditions. They include Geospatial, Earth Observation and Environment, Meteorological, Mobility and Statistics datasets, among others.

(a) The provisions on data intermediation services and data altruism organisations can also be relevant for the space sector, notably in light of the increase in the development of satellite data marketplaces and the role satellite data can have for altruistic purposes. In this regard, the dedicated provisions of the Digital Services Act (DSA) (Regulation (EU) 2022/2065) are also applicable, as the DSA sets out obligations for digital service providers, including online platforms, including to ensure transparency and manage illegal content.

• The Data Act contains provisions on, among others, access and re-use of data held by private entities and on data processing services.

- (a) The provisions on access and re-use include requirements on contractual conditions in B2B non-negotiated contracts, and obligations on B2G data sharing in case of exceptional need, as therein defined. Satellite data providers subject to the Data Act will have to comply with these obligations.
- (b) The provisions on data processing services (such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS)) aim, notably, to allow businesses to easily switch their data and other digital assets between competing providers of such services, as this is considered a precondition for the development of the data economy.

The above legal framework aims to facilitate data access and sharing. This can bring relevant opportunities for the space sector, as it enables easier access and use of data from several sources and thus facilitates the development of downstream space services and products.

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In addition, the development of the Common European Data Spaces in several sectors such as environment, mobility, health, energy, agriculture, cultural heritage, tourism (as enshrined in the European Strategy for Data), can further benefit from satellite services and data. At the same time, the announced development of the EU Strategy on Space Data Economy as a priority for 2024 may also further bring opportunities in this respect.

2. Artificial intelligence

The AI Act introduces a legal framework for the provision and deployment of AI systems, categorising them based on risk levels, with specific provisions for prohibited practices, high-risk AI systems, as well as for certain AI systems and for general purpose AI (GPAI) models. Without prejudice to specific provisions applicable to such cases, all providers and deployers of AI systems under the AI Act are subject to obligations relating to AI literacy: they shall take measures to ensure, to their best extent, a sufficient level of AI literacy of their staff and other persons dealing with the operation and use of AI systems on their behalf, taking into account their technical knowledge, experience, education and training and the context the AI systems are to be used in, and considering the persons or groups of persons on which the AI systems are to be used. As such, space actors developing or deploying AI systems shall take into consideration this obligation, without prejudice to others the application of which requires a case-by-case assessment.

An important point in this regard is, however, that the AI Act can bring interesting opportunities for space actors. Indeed, with relation to high-risk AI systems, providers and deployers are subject to a set of obligations, including as relates to data used to develop and use the system. For

instance, the AI Act establishes requirements for the training, validation and testing data sets, indicating that they shall be relevant, sufficiently representative and, to the best extent possible, free of errors and complete in view of the intended purpose. And deployers shall ensure that input data is relevant and sufficiently representative in view of the intended purpose of the high-risk AI system. This can bring important opportunities for the space sector, as contributors of data for this purpose.

3. Resilience

The envisaged EU Space Law (EUSL) aims to establish common EU rules addressing the safety, resilience and sustainability of space activities and operations. It intends to avoid and remove fragmentation and barriers across the single market caused by the heterogeneity or lack of national space legislations, while ensuring the competitiveness of the European space sector in an international trade context. The EUSL will cover three pillars: safety, resilience and sustainability. With relation to resilience, the EUSL will have to ensure due co-ordination with the NIS 2 Directive (Directive (EU) 2022/2555 concerning measures for a high common level of security of network and information systems across the Union), and the CER Directive (Directive (EU) 2022/2557 on the resilience of critical entities), as these legal acts contain a set of obligations that apply, for the first time, to the space sector, ie, to operators of ground-based infrastructure, owned, managed and operated by member states or by private parties, that support the provision of space-based services.

With special relevance is, however, the fact that the increased focus on resilience brings opportunities for the space sector: for instance, Council Recommendation on a Union-wide co-ordinated approach to strengthen the resilience

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of critical infrastructure (2023/C 20/01), set out targeted actions at Union and national level to support and enhance the resilience of critical infrastructure in identified key sectors, such as energy, digital infrastructure, transport and space. The Recommendation establishes that the European Commission should foster the use of Union surveillance assets (Copernicus, Galileo and EGNOS) to support member states in the monitoring of critical infrastructure. Once again, though the focus is on the EU Space Programme, opportunities can be explored for the wider space sector.

SINGAPORE

Law and Practice

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Beyond Horizons by Bethel Chambers LLC



Contents

1. Global Trends p.176

1.1 The "NewSpace" and Space Tech Economy p.176

2. Existing Legal and Regulatory Framework p.176

2.1 Characteristics of the Space Industry p.176

2.2 Legal System and Sources of Space Law and Regulation p.176

2.3 Role of the State in Space Law and Regulations p.177

2.4 Role of the State in the Licensing Process for Space Activities p.177

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.177

2.6 Role of the State in the Launching Process p.179

2.7 Commitment to International Treaties and Multilateral Discussions p.180

2.8 Insurance and State Measures on Liability for Damages p.182

3. Rules Applicable to Space Operators' Activities p.182

3.1 General Rules on Space Activities p.182

3.2 Principles of Non-interference and Prevention of Harmful Interference p.184

3.3 Operators' Responsibilities p.184

4. Ownership of Extraterrestrial Resources p.184

4.1 Nature of Space Resource Rights p.184

4.2 Granting of Rights to Space Resources p.186

5. Environmental Protection and Impact on Climate Change p.186

5.1 Environmental Protection in Space p.186

5.2 Climate Change and Space Activities p.187

6. Taxation of Space Activities p.187

6.1 Tax System for Space Activities p.187

6.2 Tax Incentives for Space Investors p.187

6.3 Taxation on Sale or Transfer of Space Assets p.187

7. Investment and Financing in Space Activities p.189

7.1 Impact of "NewSpace" p.189

7.2 Finance Sources for Space Activities p.189

7.3 Attracting Investment for Space Activities p.189

7.4 Foreign Investment in Space Activities p.189

7.5 Role of Securities Markets in Space Financing p.189

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supporting new technology and sustainability in infrastructure, space, aviation, advanced air mobility, urban air mobility, airports, air logistics and air cargo. Its team members have significant experience in satellite financing, frequency sharing arrangements and conversion agreements for the conversion of aircraft into satellite launchers.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

In Singapore, at present, there is no overarching local legislation that governs space law, although there are discussions around introducing a Singapore Space Act, primarily to strengthen the application of international law in outer space.

However, in May 2024, the Office for Space Technology & Industry, Singapore (OSTIn) published its “Guidelines for Singapore-Related Space Activities”, which aims to provide guidance concerning space-related activities.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The space industry in Singapore is rapidly growing against a backdrop of technological advances, the country’s strategic geographical location and a conducive start-up environment. In 2023, nine satellites carrying technologies developed by local companies were launched, and the industry is expecting to see exponential growth in all areas supporting the launch of these technologies.

2.2 Legal System and Sources of Space Law and Regulation

Singapore follows a common law system. Its approach to outer space law primarily aligns with international agreements and treaties. The nation is not only subject to its national laws but also to several international frameworks that govern activities related to outer space. The key components of outer space laws relevant to the country are as follows.

- *United Nations treaties:* Singapore adheres to the primary treaties overseen by the United Nations Office for Outer Space Affairs (UNOOSA). These include the following.
 - The Outer Space Treaty (1967), which forms the basis of international space law, stipulating that outer space shall be free for exploration and use by all countries, and outer space activities must be conducted for the benefit of all countries. Singapore became a party to the OST by accession in 1976.
 - The Convention on Registration of Objects Launched into Outer Space (1976), which Singapore has signed but not ratified, requires the registration of all space objects with the UN. Although Singapore is not formally obligated to register its space objects due to the lack of ratification, it may, in certain instances, still comply with this obligation as if it were ratified. For example, if Singapore were to launch a space object with a US launch service provider, the space object will be required to be registered because the US has ratified the treaty. The OSTIn is the key government agency through which registration of space objects will take place.
- *National legislation:* At the time of writing this guide, Singapore does not have a specific set of national laws that regulate space activities exclusively. Instead, it regulates the activities through various existing statutes and regulations that cover aspects such as telecommunications, broadcasting and aviation, which can indirectly apply to space activities.
- *Agreements and partnerships:* Singapore actively participates in bilateral and multi-lateral agreements with other nations and international organisations. These agreements often cover technology transfer, collaborative projects in space research, and development.

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- *Telecommunications and broadcasting regulations:* The Infocomm Media Development Authority (IMDA) in Singapore regulates aspects of telecommunications and broadcasting that relate to satellite communications. Licences issued by IMDA for satellite services include conditions that ensure compliance with international practices and standards.

2.3 Role of the State in Space Law and Regulations

Singapore is both a participant and a facilitator of space activities. The OSTIn assists in the support of space activities and R&D efforts, and provides grants and funding to further these. It also operates as the national focal point for the planning of all civil space matters in Singapore.

2.4 Role of the State in the Licensing Process for Space Activities

The OSTIn has guidelines to ensure that applicable entities conducting space activities are properly authorised and monitored.

Applicable entities include:

- entities registered, incorporated, or otherwise formed in Singapore that develop, launch, own, and/or operate a space object;
- entities that receive funding (wholly or partly) from the government of Singapore for space object development, launch, ownership, and/or operation; and
- entities intending to launch a space object from Singapore's territory.

Key points from the guidelines are as follows.

- *Registration of space objects:* The OSTIn maintains a national registry of space objects launched into outer space. Applicable entities

are requested to register their space objects with the OSTIn at least 30 days before the planned launch date. The registration form can be submitted online [here](#).

- *Monitoring significant changes:* Applicable entities should inform the OSTIn of any significant changes to their space objects' status. These changes include alterations to planned orbital parameters, re-entry plans, changes in supervision (ownership and/or operation), loss of function, communication loss, break-up, and deliberate transfers to other orbits or disposal orbits.
- *Routine activities:* Routine changes due to orbital decay or orbit maintenance need not be reported.

If there is any doubt as to whether a space object or change should be registered with the OSTIn, its recommendation is for applicable entities to submit the registration form regardless.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

The IMDA is the key governing body, its legislation governing radio frequencies and orbital slot allocations taking into account the International Telecommunication Union's requirements and applying principles of non-interference and non-protection basis in relation to neighbouring countries.

The Singapore Allocation Chart shows the radio frequency spectrum is divided into frequency bands allocated to various radiocommunication services, such as aeronautical, land mobile, meteorological and satellite communication services. The IMDA manages licence applications for radio frequencies and orbital slot allocations according to their framework and guidelines on the IMDA [website](#).

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The IMDA is the agency that reviews submissions and grants licences for the use of satellite orbital slots. It represents Singapore at the International Telecommunication Union (ITU), which has set out procedures and provisions in the ITU Radio Regulations (RR) for the registration, coordination and operation of satellite networks. It also acts as the notifying administration for any satellite network filing to be submitted by Singapore under the ITU RR. Entities interested in submitting satellite network filing(s) to the ITU may therefore submit a request (as stipulated in Annex 1 of the Guidelines on the Submission of Application for the Grant of Licence for the Use of Satellite Orbital Slot) to the IMDA to notify the ITU of the filing.

The IMDA will take into account whether the applicant has the required technical, financial and legal credentials to construct, launch and operate the proposed satellite system in conformity with its business plan. As the Liability Convention (discussed in detail in **2.7 Commitment to International Treaties and Multilateral Discussions**) may apply here, certain financial checking might be required to ensure the entity can indemnify the state in the event of damage to property or persons during launch activities and on-orbit operations. The IMDA will also consider the benefits that will be brought by the applicant to the industry, consumers and the economy of Singapore as a whole. Applications are submitted directly to the IMDA and licences are granted for 15 years, renewable for a further period as the IMDA thinks fit.

The IMDA also manages satellite network filings which require ITU compliance. Satellite networks must comply with ITU regulations to be registered and protected from interference. The guidelines can be briefly summarised as follows.

- *Filing process:* As mentioned above, the IMDA acts as the notifying administration for Singapore, managing the filing process which includes submission of Advanced Publication Information (API), Co-ordination Request (CR), and Notification Request to the ITU.
- *Types of satellites:* The IMDA distinguishes between geostationary (GSO) and non-geostationary (non-GSO) satellite orbits, each with different operational characteristics.
- *Operator responsibilities:* Satellite operators are responsible for providing accurate information, managing potential interference issues, and coordinating with other administrations as required by the ITU.

These guidelines ensure the efficient use of orbital slots and the avoidance of harmful interference between satellite networks.

Spectrum sharing and spectrum trading is governed by the Telecommunications (Radio-communication) Regulations which are related to radio communication. The following are some of the key points covered in this legislation.

- *ITU compliance:* These regulations ensure compliance with International Telecommunication Union (ITU) standards. They cover licensing processes, spectrum use, and operation of radio stations and networks.
- *Class licences:* The legislation distinguishes between individual station class licences and station (spectrum) class licences.
- *Localised private networks:* The regulations address localised private networks providing radio coverage in confined areas.
- *Authorised officers:* The legislation appoints authorised officers to act in respect of approving applications under the act.
- *Mobile services:* While applicable primarily to mobile services, these regulations play a cru-

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cial role in managing radio frequency spectrum and ensuring efficient communication.

While there have not been any publicly reported conflicts in respect of potential interference, the IMDA's guide to satellite network filing (see guidelines above) provides some comfort that it may attend an operator-to-operator co-ordination meeting at the request of a satellite operator or at the request of another administration (usually the governing authority of another country).

Dispute resolution in respect of any interference can also be resolved by customary dispute resolution mechanisms of mediation, arbitration or litigation, especially if the legal rights concerned in the dispute arise from a contract.

2.6 Role of the State in the Launching Process

Singapore is heavily involved in the launching of space assets on several fronts, as a provider, facilitator, and user.

Seven Singapore satellites were recently launched in India in 2023, strengthening relationships between the two countries' space programmes. These seven satellites follow a series of as many as 20 Singapore-made satellites launched in India. The primary satellite on board this recent mission, which was dedicated entirely to Singapore, was DS-SAR, a 352kg radar imaging earth observation satellite developed through a partnership between Singapore's Defence Science and Technology Agency (a government agency of Singapore) and ST Engineering.

Singapore's government is facilitating the development of space capabilities by committing to investing \$150 million in research and development (R&D) of space capabilities through its

Economic Development Board (EDB). The aim is to support key industrial sectors in the country and enhance daily life. Some of the key features of the investment are as follows.

- *Flagship Space Technology Development Programme (STDP)*: The programme, initiated by OSTIn and the National Research Foundation, will fund researchers in Singapore, and will support local space innovation in sectors such as aviation, maritime, and everyday applications such as global positioning systems (GPS).
- *Maintaining Singapore's position*: The investment will ensure that Singapore remains a research and technology hub in emerging technologies. It also positions the country as an emerging hub for capital, talent, and intellectual property.
- *Multidisciplinary approach*: Minister for Trade and Industry Gan Kim Yong will encourage local researchers in adjacent domains (such as robotics, AI, and material science) to explore how their technologies can be applied to space applications, and vice versa.
- *International partnerships*: Singapore will focus on building international partnerships and nurturing local space-tech firms. Collaborations with organisations such as the European Space Agency and the French Space Agency provide opportunities for expansion and experience.

The EDB established the OSTIn in 2013. From 2013 to 2018, the OSTIn managed a USD90 million Satellite Industry Development Fund in order to capture economic opportunities and build a thriving space industry for Singapore. The OSTIn provides support for space companies in accessing resources and reaching international markets – eg, through work with Singapore's National Technical University's Satellite Research Centre

(NTU SaRC). Over the past two decades, NTU SaRC has launched nine satellites successfully. These include Singapore's first locally designed and developed micro-satellite, X-SAT. Its VELOX series of satellites also demonstrated the centre's capabilities in the design and operation of pico and nano satellites. VELOX-II is one of the world's first LEO-GEO satellite communications on a 6U nanosatellite, and VELOX-CI was able to demonstrate radio occultation using a COT GNSS receiver. Its latest satellite, AOBA-VELOX-IV, is a collaboration with Japan's Kyushu Institute of Technology, and was also launched earlier this year to demonstrate propulsion and low light camera capabilities for small satellites to carry out future lunar missions.

The OSTIn's mandate is to serve as Singapore's national space office to develop the nation's space industry, space technology and capability, space policy and regulations, space talent and workforce, expand international partnerships and strengthen global space governance. It also operates as the national focal point to plan for all civil space matters in Singapore. As a responsible actor in space, Singapore is committed to the peaceful and sustainable use of space resources, and is a member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). To that end, the OSTIn aims to foster an empowering regulatory environment for Singapore's space activities.

2.7 Commitment to International Treaties and Multilateral Discussions

Singapore has ratified the 1968 UN Rescue Agreement and the 1972 UN Liability Convention, and signed but not ratified the Convention on Registration of Objects Launched into Outer Space (1976). The Outer Space Treaty (1967) was not ratified by Singapore, as it was closed for signature. Singapore conducted accession

of the OST in 1967, one month before it went into force.

The Outer Space Treaty (1967)

The Outer Space Treaty was considered by the Legal Subcommittee in 1966 and agreement was reached in the UN General Assembly in the same year (Resolution 2222 (XXI)). The Treaty was largely based on the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, which had been adopted by the General Assembly in its resolution 1962 (XVIII) in 1963, but added a few new provisions. The Treaty was opened for signature by the three depository Governments (the Russian Federation, the United Kingdom and the United States of America) in January 1967, and it entered into force in October 1967. The Outer Space Treaty provides the basic framework on international space law, including the following principles:

- the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;
- outer space shall be free for exploration and use by all States;
- outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;
- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- the Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- astronauts shall be regarded as the envoys of mankind;
- States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;

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- States shall be liable for damage caused by their space objects; and
- States shall avoid harmful contamination of space and celestial bodies.

The 1968 UN Rescue Agreement

The Rescue Agreement was considered and negotiated by the Legal Subcommittee from 1962 to 1967. Consensus agreement was reached in the General Assembly in 1967 (Resolution 2345 (XXII)), and the Agreement entered into force in December 1968. The Agreement, elaborating on elements of Articles 5 and 8 of the Outer Space Treaty, provides that States shall take all possible steps to rescue and assist astronauts in distress and promptly return them to the launching State, and that States shall, upon request, provide assistance to launching States in recovering space objects that return to Earth outside the territory of the Launching State.

The 1972 UN Liability Convention

The Liability Convention was considered and negotiated by the Legal Subcommittee from 1963 to 1972. Agreement was reached in the General Assembly in 1971 (Resolution 2777 (XXVI)), and the Convention entered into force in September 1972. Elaborating on Article 7 of the Outer Space Treaty, the Liability Convention provides that a launching State shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space. The Convention also provides for procedures for the settlement of claims for damages.

The Convention on Registration of Objects Launched Into Outer Space (1976)

The Registration Convention was considered and negotiated by the Legal Subcommittee from 1962. It was adopted by the General Assem-

bly in 1974 (General Assembly Resolution 3235 (XXIX)), opened for signature on 14 January 1975 and entered into force on 15 September 1976.

Building upon the desire expressed by States in the Outer Space Treaty, the Rescue Agreement and the Liability Convention to make provision for a mechanism that provided States with a means to assist in the identification of space objects, the Registration Convention expanded the scope of the United Nations Register of Objects Launched into Outer Space that had been established by Resolution 1721B (XVI) of December 1961 and addressed issues relating to States Parties' responsibilities concerning their space objects. The Secretary General was, once again, required to maintain the Register and ensure full and open access to the information provided by States and international inter-governmental organisations.

Singapore has additionally signed the Artemis Accords, which are a set of principles for the peaceful use of outer space, including the Moon, Mars, comets, and asteroids. As a signatory, Singapore has plans to cooperate more closely with like-minded partners to shape the international conversation on space norms and foster collaborations with companies, officials and researchers between Singapore and the US, as well as other signatories to the Accords. For example, Singapore and the US convened the first bilateral Space Dialogue on 10 October 2023 to strengthen bilateral cooperation in a range of areas, such as the use of satellites for earth observation and space-related use cases in the maritime and aviation domains. Singapore's Ministry of Trade also jointly organised an industry round table to discuss business opportunities for the country's companies in these areas.

All of the treaties discussed above now fall under the remit of the OSTIn, which is responsible for the proper adherence and interpretation of the treaties.

Unlike other jurisdictions, such as the US, which have codified certain UN treaties in addition to other existing laws into Title 51 of the United States Code (National and Commercial Space Programs), which brings together various distinct outer space laws, Singapore currently promotes adherence to these treaties through guidelines provided by different national agencies, such as the OSTIn and the IMDA.

Some industry commentators believe that Singapore's active participation in international agreements and guidelines would benefit from a dedicated Space Act, and would generally enhance regulatory clarity, property rules, rules on space debris, liability rules, promote responsible behaviour, and facilitate private-sector engagement in space activities. It remains to be seen whether this will be implemented in the near future.

2.8 Insurance and State Measures on Liability for Damages

In Singapore, there are guidelines by the OSTIn for the long-term sustainability of outer space activities, emphasising safe and responsible conduct during all phases of a space mission, including launch, operation, and end-of-life disposal. Registration of space objects with the OSTIn on a national registry of space objects launched into outer space records significant changes, such as orbital parameters, re-entry, change of ownership, loss of function, etc, that assist in this long-term sustainability mission.

The UN 1972 Liability Convention is the only legislative measure governing liability in respect of

space law in Singapore. Each State that launches or procures the launching of an object into outer space, and each from whose territory or facility an object is launched, is internationally liable for damage to another state. If States partner with one other, they may be jointly and severally liable for any damage caused to another.

Aside from requiring third-party liability launch insurance for satellite systems, there is no other explicit insurance requirement specific to the civil space industry.

However, there are categories of insurance that could be particularly relevant to Singapore's space sector, including:

- insurance against intellectual property insurance, initiated by the Intellectual Property Office of Singapore in June 2019; and
- fire and perils.

IP infringement insurance was announced by the Intellectual Property Office of Singapore in 2019. This insurance provides companies with protection against legal costs that are incurred in respect of infringement of IP worldwide. These include legal costs incurred enforcing IP rights and defending against IP infringement, and the legal costs of the other party if the company or individual is unsuccessful in defending their IP case.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities

As of the time of writing this article, there are no explicit rules or limitations on space activities.

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Projects and entities that deal with space data and its processing are supported by the OSTIn, but there are no specific rules on this.

At present, aside from personal data (if collected by space data) which is ordinarily governed by the Personal Data Protection Act 2021 (as amended in 2020), there are no specific rules applicable to processing or collecting space data. However, change in this area is expected, given current developments.

Satellite orbital slots are licensed for a period of 15 years, renewable for a further period determined by the IMDA.

Singapore has a comprehensive approach to cybersecurity, including the Safer Cyberspace Masterplan launched by the Cyber Security Agency (CSA). The masterplan aims to enhance cybersecurity across various domains, including space activities. Specific cybersecurity rules for space operators would likely involve:

- securing digital infrastructure – protecting space systems from cyber threats;
- data protection – ensuring sensitive data related to space activities remains secure;
- incident response – developing protocols to address cybersecurity incidents; and
- collaboration – engaging with relevant agencies and partners to strengthen cybersecurity defences.

Since space activities, assets and parts can have multiple uses including for defence, there are import/export control restrictions and restrictions against Singapore acquisitions that may be relevant.

The Strategic Goods (Control) Act (Chapter 300) (SGCA)

As part of its efforts to prevent the proliferation of weapons of mass destruction, Singapore regulates (among other activities) the transshipment, transit, transmission and export of military and dual-use goods and technology. The key legislation governing this is Singapore's Strategic Goods (Control) Act (Chapter 300) (SGCA). The SGCA is supported by some of the following subsidiary legislation:

- the Strategic Goods (Control) Regulations: these regulations provide detailed guidelines on the implementation and enforcement of the SGCA; and
- the Strategic Goods (Control) Brokering Order: this order specifically addresses the brokering of strategic goods and technology.

The SGCA also ensures that Singapore complies with international non-proliferation and export control agreements, such as:

- the Wassenaar Arrangement: An export control regime that aims to prevent the proliferation of dual-use goods and technologies; and
- other relevant multilateral export control regimes: these include agreements related to arms control, non-proliferation, and technology transfer.

Singapore customs also requires companies to apply for licences and permits. Companies trading in space objects may, depending on the item, be required to apply for licences and permits such as:

- an IN Permit and OUT permit for import or export of all goods, including controlled and non-controlled goods;

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- for controlled goods, an additional permit to be submitted to the relevant controlling agencies for processing and approval;
- certain high-technology items subject to export control that may require an Import Certificate and Delivery Verification (ICDV) by the exporter; items covered by an ICDV must be imported into Singapore directly, and are not to be diverted to other countries;
- a Strategic Goods Control (SGC) is required for exporting, transshipping or bringing into transit Strategic Goods; the SGC will be required for all goods and technology intended or likely to be used for weapons of mass destruction; and
- at the request of certain buyers, a Certificate of Origin (CO) to prove goods are made locally in Singapore.

The Singapore Significant Investments Review Bill

The Significant Investments Review Act (SIRA) is another key legislation that aims to support the non-proliferation ideology. SIRA was passed by the Singapore Parliament on 9 January 2024 and came into force on 28 March 2024. Unlike other regimes such as CFIUS in the US and NSIA in the UK, SIRA sets out a designated list of entities to which the restrictions apply. The list of designated entities is administered and operationalised by the Office of Significant Investments Review (OSIR). Once designated, the entity will be notified, and designated entities can seek reconsideration from the minister or appeal the minister's decision at a review tribunal, whose decision is final.

3.2 Principles of Non-interference and Prevention of Harmful Interference

This is covered in 2.5 Role of the State on Coordinating the Use of Radio Frequencies and

Orbital Slots regarding the IMDA non-interference guideline.

3.3 Operators' Responsibilities

Any obligations regarding behaviours in outer space would be covered by UN treaties as signed and/or ratified by Singapore.

There are no specific ESG guidelines at the moment, but conversations are taking place around this topic. For example, the OSTIn is funding research on using spaceborne Synthetic Aperture Radar (SAR) and LiDAR observations to develop capabilities in carbon measurement, reporting and verification to strengthen decarbonation efforts.

Unlike Australia, where new legislation has been introduced to tackle the problem of space debris, there are no specific regulations in respect of the same in Singapore. However, there are private companies in this space. Astroscale is a Singapore-based space company supported by the Japanese ministry that is focused on developing innovative solutions to the growing quantity of space debris and improving space sustainability.

No other areas of special interest or specific intellectual property rules apply to space activities in Singapore.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

Not applicable.

As described above, Singapore does not have specific domestic legislation, including for governing space resources. Any legal framework is derived from international law, international

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conventions or industry standard practice that governs the treatment of space resources, such as rights detailed under the Artemis Accords.

The Outer Space Treaty (OST) – Articles I & II

The Outer Space Treaty (1967) was not ratified by Singapore, as it was closed for signature. Singapore conducted accession to the OST in 1967, one month before it went into force, and is therefore bound by the principles laid out in the treaty.

Articles I and II of the OST are foundational to the legal framework governing space activities, emphasising the principles of non-appropriation and the common benefit of outer space exploration.

Article I asserts that the exploration and use of outer space must be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development. It underscores that space is the “province of all mankind”, ensuring free access to all areas of celestial bodies and prohibiting national discrimination in space activities.

Article II explicitly prohibits national appropriation of outer space and celestial bodies. This non-appropriation principle States that outer space, including the Moon and other celestial bodies, is not subject to national sovereignty by claim, use, occupation, or any other means.

- *Non-Appropriation and private entities:* The prohibition on appropriation poses significant challenges for space resource utilisation by private entities and nations. The principle aims to prevent the extension of territorial sovereignty into space, which theoretically preserves space as a global commons. However, as space activities expand, par-

ticularly regarding the mining of resources on asteroids and the Moon, the legal ambiguity surrounding private appropriation becomes more pronounced. Some argue that while States cannot claim sovereignty, this does not necessarily preclude private entities from owning extracted resources, provided there is no sovereign claim involved. Given the real possibility of extracting space resources, there are academic discussions on how the ownership of such resources, including any ownership of future IP rights, may be governed. A key proposal is to govern such rights under the “Safety Zones” concept in the Artemis Accords. “Safety Zones” are temporary areas used by signatories to the Artemis Accords on a short-term or mid-term basis to perform experiments or other activities. Such experiments or activities are to be carried out within each State’s zone to prevent interruption or disruption of another State’s zone. However, the use of “Safety Zones” creates a potential conflict with the non-appropriation principle of the Outer Space Treaty which will need to be addressed in the future.

- *Common benefit and equity:* The principle of space being the “province of all mankind” promotes international cooperation and equitable sharing of benefits derived from space activities. Yet this principle raises questions about how benefits should be distributed, particularly between spacefaring nations and those without significant space capabilities. The increasing commercialisation and privatisation of space activities challenge the implementation of this principle as private companies seek to profit from space resources, potentially leading to disparities in benefit-sharing.
- *Regulatory frameworks:* There is ongoing debate about how to develop regulatory frameworks that reconcile the OST’s princi-

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ples with the realities of modern space activities. Some propose creating new international agreements or adapting existing ones to address the exploitation of space resources, ensuring that activities comply with the non-appropriation principle while facilitating sustainable development and use of space.

The Artemis Accords on Space Mining

The Artemis Accords emphasise the importance of multilateral efforts to develop international standards for space mining. These accords, established by NASA and the US Department of State in 2020, call for signatory nations to collaborate on the creation of practices and rules for the extraction and utilisation of space resources.

A key aspect of the Artemis Accords is the commitment to use the experience gained from the accords to contribute to ongoing efforts at the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). This collaboration aims to ensure that the practices developed align with broader international goals and legal frameworks.

Signatories are expected to engage in multilateral efforts to establish these standards, reflecting a collective approach to managing space resources. The ultimate goal is to develop a body of knowledge and operational experiences that can inform and support the creation of international space law through established entities such as COPUOS. This approach is intended to prevent potential conflicts and ensure that space activities are conducted in a safe and sustainable manner.

The Artemis Accords also stress transparency, safety and peaceful use of space resources, promoting the public release of scientific data and adherence to existing international agreements

such as the Outer Space Treaty. This multilateral approach aims to create a stable and predictable environment for future space exploration and resource utilisation activities.

4.2 Granting of Rights to Space Resources

There is no regulatory authority in Singapore that grants resource rights in outer space.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

The Kessler Effect, named after NASA scientist Donald J. Kessler, describes a scenario in which the density of objects in low Earth orbit (LEO) is high enough that collisions between objects could cause a cascade effect. Each collision generates debris that increases the likelihood of further collisions, potentially leading to a situation where space operations in certain regions of orbit become hazardous, or even impossible.

The Inter-Agency Space Debris Coordination Committee (IADC) is an international forum of space agencies that collaborates on issues related to space debris. Established in 1993, the IADC focuses on the exchange of information on space debris research, the facilitation of opportunities for cooperation in space debris research, and the development of measures to mitigate space debris generation. Its membership includes major space agencies, such as NASA (United States), ESA (European Space Agency), JAXA (Japan Aerospace Exploration Agency), Roscosmos (Russia), and CNSA (China National Space Administration), among others.

Despite the widespread recognition of the importance of mitigating space debris, Singa-

pore is not currently a member of the IADC. The reasons for this could be manifold, including the relative scale of Singapore's space activities, which might not yet necessitate membership in such an international body. Singapore's space endeavours are growing, with initiatives such as the OSTIn and collaborations with other nations and commercial entities.

Membership in the IADC involves participation in technical discussions and contribution to collective efforts to manage and mitigate space debris risks. As Singapore's space activities expand, it might consider joining the IADC in the future to align with global standards and contribute to the collaborative efforts to address the growing concern of space debris and ensure the sustainable use of outer space.

5.2 Climate Change and Space Activities

From time to time, ESG grants from the OSTIn and other governmental agencies in Singapore provide financial support to develop new capabilities, create new products and expand business.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

There is no specific tax system for space activities in Singapore, but there are possible tax incentives, as described in **6.2 Tax Incentives for Space Investors**.

6.2 Tax Incentives for Space Investors

Businesses planning to engage in research and development, including within the space sector, and innovation and capability development activities, may qualify for enhanced tax deductions. Using the Enterprise Innovation Scheme (EIS), eligible businesses may also opt to con-

vert up to USD100,000 of the total qualifying expenditure for each Year of Assessment into cash at a conversion rate of 20%. Additional tax breaks are also available for Registration of IPs, acquisition and licensing of IPRs and training or innovation projects carried out with certain educational institutes or other qualified partners.

The EIS also allows for a 400% tax deduction on up to USD50,000 of expenditure per year for innovation projects carried out with polytechnics, the Institute of Technical Education (ITE) or other qualified partners.

6.3 Taxation on Sale or Transfer of Space Assets

Usual tax implications apply for transferring or selling space assets, including Goods and Services Tax (GST).

Singapore also has many double tax agreements (DTAs) with around 100 jurisdictions which offer businesses tax residents in Singapore lower tax rates when doing business with parties that are tax residents in other signatory countries, such as France, Germany and Greece (see the [IRAS](#) website). Some key DTAs that could be relevant to conducting business relating to space activities including the transferring or selling of space assets in Singapore concern the following:

- tax on royalties (relevant for IP licensing);
- tax on dividends (relevant for investments into space companies);
- tax on capital gains (relevant for investments into space companies or assets, or from space mining);
- tax on interests (relevant for leasing, financing, bond issuances and borrowings);
- tax on shipping and air transport (relevant for transportation of parts and materials in manufacturing); and

- tax on income from immovable property (relevant for warehousing, manufacturing or base stations).

There is a question of law on which tax rules apply in respect of commercial space activities since there is no clear delineation between airspace and outer space under Singapore laws. For example, a sale of goods that occurs within Singapore airspace would attract Singapore GST. Generally speaking, any taxation, be it domestic or international, typically references a taxable person/company or transactions that are in or are connected to a specific jurisdiction. Outer space, by the nature of its activity, defies these set boundaries, although an argument can be made that companies are conducting these space activities, and these companies are domiciled in some jurisdiction which is capable of attracting tax treatments. Double tax treaties can then be applied in the event that the company is treated as resident in more than one country.

The question still remains over the distinction between airspace and outer space, historically causing some countries to attempt to assert sovereignty over outer space in certain circumstances. The Bogota Declaration was one attempt, where various countries argued that geostationary orbit is not part of outer space but is a 'physical fact' resulting from Earth's gravity, therefore constituting a scarce natural resource that they were entitled to control and resulting in tax control.

The OECD Model Tax Convention 2017 attempted to resolve this issue, and maintained that a permanent establishment may only be considered to be situated in a contracting state if the relevant place of business is situated in the territory of that state, but also noted that the taxability of a space object would be subject

to how far the country's territory extends into space. It is unlikely that member countries would accept that the location of geostationary satellites can be part of the territory of a contracting state under the applicable rules of international law. The area of the satellite's signals cannot be deemed to be the area of the place of business of the operator because it is subject to the operator's discretion.

In conclusion, the laws are silent, and ordinary rules of tax residency apply. The location of the satellite in outer space at the time of the sale of a satellite is not usually the significant factor considered for tax purposes. However, if a satellite part were on the ground, or within airspace, normal taxation rules would apply for GST, save that there could be zero-rating if the relevant good is for international supplies and services.

Zero-Rating of Telecommunication Related Services

0% GST can be charged for prescribed services involving international telecommunication transmission under section 21(3)(q) under Fifth Schedule of the GST (International Services Order). To satisfy the zero-rating requirement, a company has to:

- fall under the requirements of paragraphs 1-5 of the prescribed services in the Fifth Schedule;
- comprise international transmission, ie, the provision of any means of telecommunication transmitted:
- from a place outside Singapore to another place outside Singapore;
- from a place in Singapore to a place outside Singapore; or
- from a place outside Singapore to a place in Singapore.

The telecommunication must not be a local transmission, ie, it cannot be from one location in Singapore to another location in Singapore. For example, a transmission from a point in Singapore to Hong Kong and back to another point in Singapore is considered a local transmission.

The legislation specifically excludes the sale and lease of telecommunications equipment, even if that the sale or lease may be in connection with international transmission. Repair, maintenance or management services may be regarded as prescribed services under paragraph 5 of the Fifth Schedule if they are provided in connection with international telecommunication transmission by the same supplier and are ancillary to the provision of prescribed telecommunication services.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

There are about 21 new NewSpace startups in Singapore. There is a huge interest in and demand for venture capital funding in the space sector. The trend for fundraising remains strong, despite a decline in 2022 within the global space start-up arena.

7.2 Finance Sources for Space Activities

Both public and private funding remains strong in Singapore. In 2022, the government announced that it would be investing SGD150

million (USD111 million) to help firms research and develop the country’s space capabilities. This would come in the form of grants and incentives through the OSTIn, and include grants for ESG in space.

7.3 Attracting Investment for Space Activities

Enterprise Singapore, or EnterpriseSG, supports the growth of start-ups locally and includes investments, bilateral support and the Space Technology Development Programme. Tax incentives can also be used to attract investments as well as low business set-up costs, strategic geographical locations and reduced expenses.

7.4 Foreign Investment in Space Activities

Telecommunications and media are regulated sectors which may fall under the remit of space activities. These sectors are subject to foreign investment control under the Significant Investments Review Act (SIRA). Please see **3.1 General Rules on Space Activities** for a recap on SIRA.

7.5 Role of Securities Markets in Space Financing

Most Singapore-grown space entities are early-stage entities funded by grants, organic growth or venture capital funds. Only telecommunications and defence players have been able to access securities markets.

Trends and Developments

Contributed by:

Hui Ling Teo and Sonia Motwani

Beyond Horizons by Bethel Chambers LLC

Beyond Horizons by Bethel Chambers LLC is a specialised service by Bethel Chambers LLC, focused on transportation and aerospace. The firm has a five-strong team of senior lawyers, tax experts and support staff. The law practice is based in Singapore with certain supporting members based in the UK to assist with international matters and provide 24-hour assistance. Hui Ling Law carries out pioneering work

supporting new technology and sustainability in infrastructure, space, aviation, advanced air mobility, urban air mobility, airports, air logistics and air cargo. Its team members have significant experience in satellite financing, frequency sharing arrangements and conversion agreements for the conversion of aircraft into satellite launchers.

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Corporate Law and Startup Basis

Singapore is an ideal destination for companies, with its commercially focused environment, straightforward system for conducting business and multiple tax advantages. The country has the following compelling characteristics for startups or companies that are looking to redomicile.

- *Emerging hub for fintech and logistics* – Singapore is well-placed to surpass Hong Kong as the regional hub for FinTech and logistics. As the largest concentration of FinTech startups in Southeast Asia, with a healthy financial sector and in a prime location, Singapore is an excellent place for space-related companies to collaborate with like-minded companies and enhance their operations.
- *Leading maritime hub* – Singapore is a key hub for global trade and logistics as the second-largest port in the world in terms of exports and maritime traffic. It boasts excellent port facilities, efficient customs processes, and a strategic geographical location which allows for space-related materials to be easily imported and high-tech equipment such as satellites to be easily exported, making it an essential country for the space sector.
- *Offers government subsidies and support* – Singapore offers substantial subsidies and incentives to support business activities and encourage external investments, often with no or minimal strings attached. From grants for research and development to funding support for technology adoption, the government's proactive initiatives foster innovation and entrepreneurship across various industries, including space-related companies.
- *Preferred investment destination* – A sizeable portion of investment funds within the ASEAN region flows into or through Singapore, accounting for 75% of total investments. This volume of capital underscores Singapore's status as a preferred investment destination, offering unequalled opportunities for startups and companies to secure funding and expand their businesses.
- *Offers an efficient company set-up process* – Startups can easily establish their presence in Singapore, which has a streamlined incorporation process allowing new companies to be up and running within a few days with just SGD1 of paid-up capital. Singapore places emphasis on companies focusing and growing their businesses from the outset by reducing administrative hurdles at every stage, with

most ancillary registration activities taking just a few days.

- *Has a tax-friendly regime* – Singapore's tax administration is extremely attractive for companies, offering various breaks to support business growth such as:

- (a) tax exemption for companies earning less than SGD100,000 in profits within the first three years of trading, encouraging entrepreneurship and small-business development;
- (b) capping of corporate tax at 17%, providing businesses with a competitive tax environment conducive to long-term sustainability and profitability; and
- (c) tax-free distribution of dividends to shareholders further incentivises investments into startups and promotes shareholder returns.

- *Offers flexible business and legal structures* – Individuals who elect to conduct business in Singapore have the flexibility to choose from various business structures such as Representative Office, Private Limited Company, Branch Office, or Sole Proprietorship, allowing them to tailor the structure to their specific needs. Singapore also has an excellent reputation for dispute resolution with a clear judicial process and a strong, developed body of commercial law.

Incorporating Companies in Singapore

Incorporating as a private limited company

Applicants must begin by visiting the Accounting and Corporate Regulatory Authority (ACRA) [website](#) to start the incorporation process, taking with them the following.

- An ACRA-approved entity name, which adheres to Singapore's company naming guidelines.

- Details of directors, company secretary, shareholders, and other key personnel. At least one director must be a Singapore citizen or resident, but there is also the option to appoint a nominee director without decision-making powers to fulfil this requirement.
- A registered office address in Singapore, which serves as the official address for communication and legal notices.
- A minimum of SGD1 of issued share capital, which signifies the initial investment in the company.

Once the registration is completed and a business profile has been obtained for the company, other essential elements, such as bank accounts, necessary permits, leasing premises and Goods and Services Tax (GST) registration, if applicable, can be set up.

At this stage, companies may choose to explore their potential eligibility for grants or tax incentives offered by government agencies such as the Economic Development Board (EDB) and Enterprise Singapore (see below).

Re-domiciling Businesses to Singapore

Re-domiciling businesses to Singapore can be carried out through either a share transfer or an asset transfer.

Share transfer

This option involves transferring all shares from the existing company to the newly registered Singapore company. The directors or shareholders may then opt for the Singapore company to mirror the shareholding structure of the existing entity.

It is essential to be aware of potential tax liabilities associated with the transfer of shares and to draft specialist agreements to govern the

process, particularly if no monetary exchange is involved. Seeking legal advice is highly recommended to navigate this process efficiently and effectively.

Asset transfer

This method involves individually transferring assets of the existing company, such as contracts, real estate, intellectual property, and employees, to the Singapore company.

Given the complexity of this process and involvement of multiple stakeholders, including various third parties, seeking legal advice is highly recommended to ensure a smooth transition and to avoid potential tax liabilities.

Tax Incentives Provided by Enterprise Singapore

Enterprise Singapore offers various tax incentives and grants to support businesses in their growth and innovation endeavours.

Market readiness assistance grant

The Market Readiness Assistance (MRA) Grant assists Singapore companies in expanding their international presence and exploring overseas markets. Eligible businesses can receive funding support capped at SGD100,000 for activities such as market promotion, business development, market assessment, market entry, and marketing activities in targeted overseas markets. The grant covers up to 50% of eligible costs, including third-party consultancy fees, market entry expenses, and promotional materials.

Enterprise development grant

The Enterprise Development Grant (EDG) supports businesses in their efforts to innovate, upgrade, grow and transform their business. This grant supports projects that help compa-

nies upgrade their business, innovate or venture overseas, under three categories, as follows.

- *Core capabilities*: Business Strategy Development, Financial Management, Human Capital Development, Service Excellence, Strategic Brand and Marketing Development.
- *Innovation and productivity*: Automation, Process Redesign and Product Development.
- *Market access*: Pilot Project and Test Bedding; and Standards Adoption.

Eligible companies can receive funding support of up to 70% of qualifying project costs, including consultancy fees, software and equipment expenses, and employee training. Note that, if companies apply for EDG support for management consultancy-related costs, they must engage management consultants with the Singapore Accreditation Council (accredited TR43 or SS680 certification).

Productivity solutions grant

The Productivity Solutions Grant (PSG) encourages businesses to adopt technology solutions and equipment to enhance productivity and efficiency. It covers a wide range of pre-approved IT solutions and equipment across sectors such as retail, food services, logistics, and manufacturing. Businesses can receive funding support of up to 50% of qualifying costs for the adoption of PSG-approved solutions, including software subscriptions, equipment purchases, and implementation expenses.

Startup SG founder

Startup SG Founder provides support for first-time entrepreneurs in Singapore by offering mentorship, startup capital, and networking opportunities. Eligible individuals can receive a grant of up to SGD50,000 for their startup venture, along with access to mentorship programmes

and entrepreneurial resources. To qualify, applicants must be Singaporean citizens or Permanent Residents and hold at least 30% equity in the startup company.

Trading and Operating as a Space Company

Companies may be required to apply for certain licences and permits within the context of trading and operating as space entities, and particularly when importing high-tech items such as satellites or low Earth objects (LEOs).

Assuming that the company is already incorporated as a trading company and registered with Singapore Customs, the next step would be to apply for the relevant licences and permits based on the item being imported or exported, as follows.

- An IN Permit and OUT permit for the import or export of all goods, including controlled and non-controlled goods as determined by the Singapore Customs Authority.
- A permit for controlled goods, which must be submitted to the relevant controlling agencies for processing and approval.
- Certain high-technology items are subject to export control and may require an Import Certificate and Delivery Verification (ICDV) by the exporter. Items covered by an ICDV must be imported into Singapore directly and are not to be diverted to other countries.
- Strategic Goods Control (SGC) is required for exporting, transshipping or bringing in transit Strategic Goods. The SGC will be required for all goods and technology that are intended or likely to be used for weapons of mass destruction.
- Certain buyers may ask exporters for a Certificate of Origin (CO) to prove goods are made locally in Singapore.

Singapore is also party to many free trade agreements, including with the US that has key space programmes. Singapore is not a member of the four multilateral regimes: Australia Group, Missile Technology Control Regime, Nuclear Suppliers Group, or Wassenaar Arrangement, but does maintain a national list of controlled goods based on the most recent European Union control list. This list is divided into two parts: military goods and dual-use goods. The dual-use list is similar in structure to the US Commerce Control List and follows the European Union's general numbering system.

Another key advantage when trading and operating as a space company is tax. Singapore has many double tax agreements (DTAs) with around 100 jurisdictions which offer businesses that are tax resident in Singapore lower tax rates when doing business with parties that are tax resident in other signatory countries, such as France, Germany and Greece. We refer you to the Inland Revenue Authority of Singapore (IRAS) website for more on DTAs [here](#).

Some key DTAs that could be relevant to conducting business relating to space activities including the transferring or selling of space assets in Singapore concern the following:

- tax on royalties (relevant for IP licensing);
- tax on dividends (relevant for investments into space companies);
- tax on capital gains (relevant for investments into space companies or assets, or from space mining);
- tax on interests (relevant for leasing, financing, bond issuances and borrowings);
- tax on shipping and air transport (relevant for transportation of parts and materials in manufacturing); and

- tax on income from immovable property (relevant for warehousing, manufacturing or base stations).

Investments Into Space

Singapore is also a prime space to facilitate investments into space. Two ways to invest in this space are through venture capital (VC) funds and private equity (PE) funds. Although VC and PE funds have their distinct features, the setting up funds largely follow the same set-up process and considerations.

Setting up funds in Singapore involves several key considerations. A Variable Capital Company (VCC) is a popular structure for funds in Singapore due to its flexibility, allowing the creation of multiple sub-funds under a single umbrella. Each sub-fund can have different investment strategies and investor bases, enhancing operational efficiency.

There are several tax incentives that a VCC can take advantage of, such as the 13O (Resident Fund) or 13U (Enhanced-Tier Fund). If the VCC (and any sub-fund under it) is controlled and managed in Singapore for the calendar year for tax, then the VCC can take advantage of DTAs and avoid double taxation. Dividends paid by a VCC are exempt from tax. VCCs can also take advantage of several VCC specific tax reliefs such as exemptions of:

- income from a fund;
- income from a company incorporated and resident in Singapore arising from investments managed by fund manager in Singapore; and
- income from investments managed by fund managers in Singapore.

The next step would be to apply for a Capital Markets Services (CMS) License with the Monetary Authority of Singapore (MAS) under the Venture Capital Fund Manager regime. This regime simplifies the licensing process for fund managers, exempting them from some of the stringent requirements imposed on other fund managers. VCCs should ensure that directors and key personnel meet the MAS guidelines on fitness and propriety, including that they possess relevant experience and background checks.

VCCs should establish (if not already established) a permanent physical office in Singapore, appoint at least two directors who are resident in Singapore, two full-time resident professionals, and engage fund administrators, legal counsel, auditors, and tax advisors to manage the operational aspects of the company. Companies are also required to maintain ongoing compliance with MAS requirements, including anti-money laundering and countering the financing of terrorism regulations, and submit periodic regulatory returns.

Singapore's vibrant startup ecosystem is a testament to its strategic combination of robust infrastructure, supportive government policies, and dynamic VC and PE investments. Singapore's continued reputation as a key financial hub attracts significant VC and PE funds, supporting an innovative and entrepreneurial environment. With initiatives such as the Startup SG programme and other tax incentives (some of which are discussed above), Singapore not only nurtures local talent but also draws a large crowd of international startups and investors. This synergy between a conducive business climate and active investment community makes Singapore an excellent place to do business, particularly for tech-driven and scalable ventures within the space environment.

Exiting Investments in a Space Company

Singapore offers an excellent environment for space startups looking for a clear and straightforward exit strategy. It has a major advantage over more complex regulatory regimes in countries such as the UK and the US in that it has very well-defined and transparent investment laws that provide clear guidelines and procedures for businesses – including those in the space and satellite sectors – looking to engage in mergers, acquisitions, or sales.

In the US, the sale of defence-related businesses, such as those involved in satellite technology, is often subject to tough regulatory scrutiny. The Committee on Foreign Investment in the United States (CFIUS) requires detailed reporting and can block or unwind transactions that are considered a threat to national security. Similarly, in the UK, the National Security and Investment Act imposes significant reporting requirements, and allows the government to intervene in deals that may pose risks to national security. These regulations, while important and necessary for security purposes, introduce many layers of complexity for businesses that operate in the space sector. When considering long-term business strategies, companies and investors may hesitate to operate in these regions due to such enhanced governmental overview and intervention.

In contrast, Singapore's regulatory framework, particularly under the Investment Review Act, provides a much clearer pathway for such seemingly risky transactions. The Singapore regime specifies a transparent list of affected companies, detailing the sector and types of businesses that are subject to review. This clarity allows space startups to understand from the outset whether they will face any regulatory hurdles during a sale or acquisition, significantly

reducing the uncertainty that can impede exit planning. Similarly, investors can justify their investments to their stakeholders with this governmental transparency.

Singapore's approach is extremely beneficial for space startups, as it promotes a stable and predictable business environment. Companies can operate with the assurance that, as long as they comply with the clearly defined regulations, they can proceed with transactions without unexpected governmental intervention. This clarity is also particularly advantageous for attracting new foreign investors and partners, who prefer conducting business in countries with no or little regulatory risks.

The Road Ahead

Singapore is a pioneering force in Environmental, Social, and Governance (ESG) initiatives, showcasing a strong commitment to sustainability across various sectors. The government's proactive support for ESG principles is evident in initiatives such as the Sustainable Singapore Blueprint and the introduction of regulatory frameworks promoting responsible business practices. For example, the MAS has issued guidelines for financial institutions to integrate environmental risk considerations into their lending and investment decisions, encouraging the adoption of sustainable practices across the financial sector, from a macro policy perspective.

This emphasis on ESG aligns closely with Singapore's expanding space industry, where sustainability and responsible resource management are paramount. As space activities expand, there are increasing concerns regarding space debris and its environmental impact, and ethical considerations regarding resource extraction come to the forefront. Although there are some inter-

national laws already governing these areas, it is clear that further reform is required. Singapore frequently engages across borders to deepen such discussions. By continuing to champion ESG principles, Singapore positions itself as a global leader not only in space technology but also in fostering sustainable and ethical practices within the space sector.

Moreover, Singapore is taking significant strides towards the development of a unified space law act to govern its rapidly growing space industry. The establishment of a comprehensive legal framework is crucial for providing clarity and certainty to businesses operating in space-related activities, including satellite operations, space tourism, and asteroid mining. By streamlining regulations and ensuring enhanced adherence to international space law principles, the country aims to create an attractive environment for space startups and investors while safeguarding national interests and promoting responsible space exploration.

In this evolving landscape, the potential for the growth of space law insurance becomes increasingly evident. The insurance, which covers risks associated with space activities, including liability, property damage, intellectual property infringement and regulatory compliance, plays a critical role in mitigating financial uncertainties for space ventures and providing companies with security as they test uncharted technology. With Singapore's proactive approach to space regulation and its commitment to fostering a conducive business environment, fertile ground exists for the expansion of space law insurance services. As the space industry continues to mature and diversify, the demand for unified insurance regulation and specialised insurance products tailored to space-related risks is likely to increase, presenting new opportunities for insurers and reinsurers to innovate and collaborate with stakeholders in the space ecosystem.



Law and Practice

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Contents

1. Global Trends p.200

1.1 The “NewSpace” and Space Tech Economy p.200

2. Existing Legal and Regulatory Framework p.202

2.1 Characteristics of the Space Industry p.202

2.2 Legal System and Sources of Space Law and Regulation p.203

2.3 Role of the State in Space Law and Regulations p.204

2.4 Role of the State in the Licensing Process for Space Activities p.206

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.207

2.6 Role of the State in the Launching Process p.209

2.7 Commitment to International Treaties and Multilateral Discussions p.210

2.8 Insurance and State Measures on Liability for Damages p.211

3. Rules Applicable to Space Operators’ Activities p.211

3.1 General Rules on Space Activities p.211

3.2 Principles of Non-interference and Prevention of Harmful Interference p.211

3.3 Operators’ Responsibilities p.211

4. Ownership of Extraterrestrial Resources p.212

4.1 Nature of Space Resource Rights p.212

4.2 Granting of Rights to Space Resources p.213

5. Environmental Protection and Impact on Climate Change p.213

5.1 Environmental Protection in Space p.213

5.2 Climate Change and Space Activities p.213

6. Taxation of Space Activities p.214

6.1 Tax System for Space Activities p.214

6.2 Tax Incentives for Space Investors p.214

6.3 Taxation on Sale or Transfer of Space Assets p.214

7. Investment and Financing in Space Activities p.214

7.1 Impact of “NewSpace” p.214

7.2 Finance Sources for Space Activities p.215

7.3 Attracting Investment for Space Activities p.215

7.4 Foreign Investment in Space Activities p.215

7.5 Role of Securities Markets in Space Financing p.215

AUGUSTA ABOGADOS is a business law firm specialising in corporate and commercial law, tax, restructuring, labour law, air and space law and procedural law, amongst other areas. The rapid development of space-related technologies, collaboration models between private and public actors, the increasing number of private projects, and the availability of private financing sources contribute to a novel scenario. The complexity of legal requirements and the approval of new regulatory measure are growing rapidly, driven also by the need to protect ex-

isting know-how and the value of investments. Building on its accredited experience in the areas of aviation and drones law, in 2021 **AUGUSTA ABOGADOS** made the strategic decision to develop a new space economy law department, to advise clients and public authorities on legal matters such as the financing of space assets and the launching of satellites, providing guidance on the regulation of satellites and associated frequencies, and monitoring space law legislation and regulation.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

The International Legal Framework (Corpus Iuris Spatialis) and Spain

International space law is historically based on the following five United Nations treaties, which establish fundamental principles such as freedom of exploration and peaceful use of space, non-appropriation and responsibility for space activities:

- the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the “Outer Space Treaty”, or OST);
- the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space;
- the 1972 Convention on International Liability for Damage Caused by Space Objects;
- the 1974 Convention on Registration of Objects Launched into Outer Space; and
- the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

Spain is a state party and has ratified all these treaties, except the 1979 Moon Treaty.

Other Relevant International Treaties

Spain has also ratified the following relevant international conventions:

- the 1963 Treaty Banning Nuclear Weapon Tests;
- the 1971 Agreement relating to the International Telecommunications Satellite Organization;
- the 1974 Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite (signature only);
- the 1975 Convention for the Establishment of a European Space Agency (ESA);
- the 1976 Convention on the International Mobile Satellite Organization;
- the 1982 Convention Establishing the European Telecommunications Satellite Organization (EUTELSAT IGO);
- the 1983 Convention for the Establishment of a European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT); and
- the 1992 International Telecommunication Constitution and Convention.

The following instruments are also of importance.

- The Artemis Agreements were established in 2020 by the US Space Agency (NASA) and reinforce the commitment of signatory states (including Spain) to the norms of international space law, establishing a set of practical principles to guide co-operation in space exploration among nations, including those participating in NASA's Artemis Programme. Spain became a direct signatory to the Artemis Agreements through the Spanish Space Agency (*Agencia Espacial Española* – AEE).
- International Satellite Search and Rescue System (COSPAS-SARSAT): Spain is a participating state in the ground segment of the international distress alert system that uses satellites to locate and rescue people in distress on land, at sea or in the air.

Other International Instruments

The resolutions of the United Nations General Assembly (UNGA) and the guidelines of the Committee on the Peaceful Uses of Outer Space (COPUOS) are also part of the Spanish legal environment. Although UNGA resolutions do not have binding effects in the strict sense of treaties, they do form part of international custom ("soft law") recognised by state practice. The most relevant UNGA resolutions in the field of space include the following:

- UNGA Resolution 41/61 on "Principles Relating to Remote Sensing of the Earth from Outer Space";
- UNGA Resolution 47/68 on "Principles Relevant to the Use of Nuclear Power Sources in Outer Space";
- UNGA Resolutions 51/122 and 75/36 (of 2023, most recently): "Declaration on International Co-operation 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"; and

- UNGA Resolutions 78/19 and 78/19 (2023) on "Prevention of an arms race in outer space".

Sustainability

In the area of sustainability, an area of growing concern, the Inter-Agency Space Debris Coordination Committee (IADC) and the United Nations Office for Outer Space Affairs (UNOOSA) established their "Space Debris Mitigation Guidelines", which the UNGA endorsed in its Resolution 62/217 for private operators, setting out "good practices" for the long-term sustainability of space activities. However, the latest UNGA Resolution (A/RES/77/72) about guidelines on long-term sustainability and space debris mitigation states that they are still under constant development and adapting to the new capabilities of the sector in practice, in co-operation with COPUOS and the IADC.

European Legal Framework

Spain is a member of the European Union (EU) and of the ESA. As such, a number of European rules and regulations on space matters form part of the Spanish legal system, with the most relevant being as follows:

- the Founding Convention of the European Space Agency of 30 May 1975: Spain ratified the Convention on 15 January 1979 and participates actively in its programmes;
- Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community (INSPIRE);
- Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and

- the European Union Agency for the Space Programme;
- the Charter of the European Union Space Programme Agency (EUSPA), which establishes the legal and operational framework for EUSPA: Spain participates in EUSPA, which manages the European satellite navigation (Galileo and EGNOS) and Earth observation (Copernicus) programmes; and
- Regulation (EU) 2024/795 of the European Parliament and of the Council of 17 May 2024 establishing a Strategic Technology Platform for Europe (STEP).

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

By 2020, the aerospace sector already represented 1.2% of Spain's GDP, with more than 150,000 direct and indirect jobs and more than EUR1.5 billion invested in research and development and innovation (R&D&I). In 2022, Spain was positioned as the fourth space power in the EU and the fifth in terms of contribution to the ESA, with EUR250 million.

The Spanish space industry in 2024 is characterised by a number of factors, as follows.

- Strong governmental impulse: the Spanish public authorities play a fundamental role in the development of the space sector through significant investments in R&D&I. Prominent examples include programmes such as the Strategic Project for Aerospace Economic Recovery and Transformation (PERTE), with EUR4.3 billion invested, and the Space Technology Programme (PTE), with EUR70 million in 2024. NextGeneration EU funds are

also invested to foster innovation in the space sector.

- Strong private sector participation: in Spain, the sector has a number of companies that actively participate in projects of national and international relevance, especially in public-private collaboration, which is a key element for the promotion of the industry. Among these, Airbus Defence and Space España, GMV, Hisdesat, Satlantis and PLD Space all stand out, and are all actively involved in national and international projects, collaborating closely with the public sector. These companies are involved in the development of satellites, Earth observation systems and reusable space launchers.
- Public-private partnerships as an engine for development: synergy between the public and private sectors has been crucial to the success of the space sector in Spain. Programmes such as PAZ, Ingenio and SEOSAT-Ingenio are examples of collaboration that have driven the development of advanced technologies and generated high added-value solutions for society.
- Active collaboration and participation in international and European programmes.

Another characteristic of the private sector of the Spanish aerospace industry is its specialisation in Earth observation and satellite development segments.

In contrast, Spain lacks autonomy of access to space due to several factors and challenges involved in launch activities (economic, technological, strategic and also regulatory). In particular, the Spanish space sector still lacks a specific legal regime to provide legal certainty to private traffic operators, to gain independence of access to space and to encourage investment by foreign or national private entities. A body of

new regulations is expected to be published in the coming years. Meanwhile, companies such as PLD Space (www.pldspace.com) have committed to diversifying the industry despite the economic, technological, strategic and, above all, regulatory challenges of the sector.

2.2 Legal System and Sources of Space Law and Regulation

The Spanish Legal System and its System of Sources

The Spanish legal system is based on civil law, which is characterised by its emphasis on written law, codified in systematic legal bodies. The Spanish Constitution (1978) is the supreme rule of the internal legal system and establishes the system of sources of law of the Spanish legal system, in the following order of priority:

- the law, emanating both from the legislative power of the state, and from those provisions of lower rank such as decrees, regulations or ordinances of public law;
- custom; and
- the general principles of law in the absence of law.

Despite the order of precedence established in the Constitution, the general principles of law are present at all times, giving the other rules full meaning.

Jurisprudence (repeated pronouncements or judgments in the same interpretative sense on laws or principles of law issued by the Supreme Court and High Courts of Justice) is not a source of law in the Spanish legal system, strictly speaking, as it does not produce positive law. However, it has the function of complementing the legal system, interpreting laws in accordance with the uses, customs and constitutional and

general principles of law in order to achieve unity of criteria.

Sources of Space Law in Spain

Spain has not yet developed a unified or comprehensive body of regulations on space matters. As explained in 1.1 The “NewSpace” and Space Tech Economy, the sources of domestic law specific to space matters are currently limited to:

- Royal Decree 278/1995, which establishes and regulates the registration of objects launched into outer space;
- Law 11/2022 – the General Telecommunications Law;
- Royal Decree 123/2017, which approves the Regulation on the use of the public radioelectric domain;
- Law 17/2022, approving the creation of the Spanish Space Agency; and
- Royal Decree 158/2023, approving the by-laws of the Spanish Space Agency.

However, the configuration of the Spanish legal system allows for the application of more general provisions of the legal system in those matters not specifically regulated by special laws or regulations, as is the case in the following areas:

- civil liability of private operators, to which the provisions of the Civil Code and related laws apply;
- in the field of intellectual and industrial property, where the general laws and regulations become relevant;
- in the field of public law, in matters of contracts and concessions with the public administrations, where the general regime set out in the 2017 Public Sector Contracts Law and the 2015 Common Administrative Procedure Law applies; and

- the protection of personal data, an important topic for the new space industry, is regulated by the European General Data Protection Regulation (GDPR) and the 2018 Organic Law.

Works to approve a domestic Space Activities Act is under way, although the results are not expected to be published in the short term due to the recent creation of the AEE. Nevertheless, the government has set this as a priority since it feels that the enactment of a national body of laws and regulations will give private operators greater legal certainty in their economic activities, and that this will lead to greater autonomy in access to space.

Impact of the Fundamental Principles of International Space Law

The UNGA resolutions and Spain's commitment as a member of international law organisations (UN, COPUOS, ITU) on international co-operation, sustainability and the peaceful use of space are reflected in Spain's space policy, through the 2019-2023 Space Strategy, and are fully contemplated during the gradual development of a domestic legal framework, as follows.

- Protection of the space environment: Spain has focused much of its public funding on research into and the development of more sustainable technologies, more efficient propulsion systems, recoverable and reusable launchers and space debris mitigation technologies.
- Principle of freedom of exploration and peaceful use of outer space: Spain adheres to the UNGA resolutions on the prevention of an arms race in space and the peaceful use of outer space for exploration.
- International co-operation: Spain has participated in international space co-operation pro-

grammes, such as those of ESA and NASA (with the Artemis Agreements).

- Non-appropriation of outer space: as a permanent member of COPUOS, Spain supports UNGA Resolution 51/122 of 4 February 1997, the "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".

In May 2024, the Socialist Party submitted a proposal to Parliament to update and develop the National Space Strategy to raise the current terms to a higher level. The proposal is presently under parliamentary review.

Judicial decisions by the Spanish courts on space law remain scarce. Spanish courts have ruled on issues such as liability for damage caused by space objects and the protection of intellectual property in space.

2.3 Role of the State in Space Law and Regulations

Spain's Role in Space Activities

With the advent of NewSpace, Spain intends to maintain its role as an important actor. To achieve this, the public administrations are acting as facilitators of an ecosystem that promotes the technological development of private operators through public funding.

Public-private collaboration is currently the model for boosting the sector. To this end, the role of the state will be essential not only in the area of financing, but also in providing a special legal regime for the industry's activities.

The Spanish Space Agency and Relevant Ministries

The AEE was created in 2022 and has its headquarters in Seville. It was constituted as a public body, attached to the Ministries of Science and Innovation and Defence, with an extensive range of administrative powers and competences to meet the objective of centralising inter-ministerial competences in a single agency.

The most important powers conferred on the AEE include the following.

- Representation before ESA and EUSPA, specifically by managing the payment and returns derived from the national contribution to the European intergovernmental organisation, as well as managing Spain's participation in ESA programmes (without prejudice to those attributed to other ministries).
- Promotion of bilateral or multinational co-operation agreements with other space agencies, as well as signing agreements or other legal instruments with public bodies or subjects of international law, or with private entities.
- Co-ordination of defence space programmes and supporting the priorities reflected in the National Security Strategy, the National Aerospace Security Strategy and the National Defence Directive within the framework of the Agency, given the dual character of the Agency and the criticality of space in security and defence aspects.
- Co-ordination, development and direction of plans, strategies and programmes related to research (creation of national space programmes), from both a management and funding point of view.
- Elaboration of a National Space Policy proposal, and design and co-ordination of a National Space Strategy.
- Encouraging the commercial use of space.
- The promotion of public-private partnerships in the space sector, with the AEE being understood not only as a financial partner for private operators but also as a preferred customer for capabilities, products and services.
- The financing and co-ordination of public funds, as well as the creation of economic-financial support lines applicable to programmes of scientific, technological and innovation activities. Previously, the CDTI (an entity attached to the Ministry of Science and Innovation) managed public funds from the EU earmarked for research and scientific activities, but the AEE will now take over this function.
- Support for safety oversight in space or space systems management, in collaboration with the relevant departments for the issuance of certifications, assurances, authorisations, reports or similar instruments once safety requirements have been verified. It should be noted that the granting of such safety-related licences will apply to launch activities, potential spaceports, sub-orbital flight operations, commercial access to space, space traffic, space debris and satellite constellations.
- Support for security monitoring, in co-ordination with the competent national bodies, against acts of unlawful interference in the field of national security and defence. Such monitoring will be aligned with the requirements set by the EU Security Accreditation Regulations, covering matters such as cyberattacks, control and management of technology transfers or information protection.
- The most relevant power of the AEE will be the elaboration of a proposal for a Preliminary Draft Space Law, together with the relevant ministerial departments that make up ESA's organic composition. The Space Act will cre-

ate a regulatory framework for space activity in the context of NewSpace.

- Finally, promotion of the private investment ecosystem in the space sector through technology funds, venture capital, investors in emerging companies and support for Spanish companies in the sector by implementing measures to stimulate private investment.

In line with the ministries that make up its Governing Council (the Agency's collegiate governing body), the AEE is made up of representatives from the Ministries of:

- Science and Innovation;
- Defence;
- Transport, Mobility and Urban Agenda;
- Industry, Trade and Tourism;
- Foreign Affairs, European Union and Co-operation;
- Economic Affairs and Digital Transformation;
- the Presidency, Relations with the Courts and Democratic Memory;
- Finance and Public Function;
- the Interior;
- Agriculture, Fisheries and Food; and
- Ecological Transition and the Demographic Challenge.

However, the management of the spectrum orbit resource and the control and management of the Register of Space Objects fall outside the AEE's scope; the first is the exclusive responsibility of the Ministry of Economic Affairs and Digital Transformation, while the second is the responsibility of the Ministry of Industry, Trade and Tourism.

2.4 Role of the State in the Licensing Process for Space Activities

Under current laws, there is no specific authorisation regime for the various space activities

that emerge from the NewSpace concept. Spain does not yet have a law on space activities that unifies the different types of activities in a catalogue, nor is there any specific regulation on authorisations and licences.

However, registration in the Register of Objects Launched into Outer Space (created by Royal Decree 278/1995) is an obligation for any operator intending to launch any type of satellite or other object into outer space (low or high orbit). This register is attached to the Ministry of Foreign Affairs and mainly serves the purpose of controlling launch activity, in compliance with the international treaties to which Spain is a party – namely the 1974 Convention on Registration of Objects Launched into Outer Space. The registration of objects allows liability for damage to be attributed to Spain in accordance with international law.

Space objects launched from the Spanish territory, those whose launch has been promoted by the Spanish state and those launched from Spanish installations in another territory must be registered in this register. If there are more than two launching states (as per the terms of the 1974 Convention), they must agree in which Register the object is to be registered and therefore determine the jurisdiction applicable to it, as well as the attribution of liability in the event of damage.

The registration of space objects shall contain the following data:

- the name(s) of the launching state(s);
- an appropriate designation of the space object or its registration number;
- the date and territory or place of launch;
- basic orbital parameters, including nodal period, inclination, apogee and perigee; and

- the general function of the spatial object.

The regulations of the Register may be amended in the near future, as some proposals have already been put forward to adapt them to the new economic trends.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

Spanish Legal Regime for the Assignment and Use of Radio Frequencies

The Orbit-Spectrum Resource (OSR) is a public domain asset consisting of bands or bands and frequencies provided by electromagnetic waves located in low-Earth orbit that allow communication via satellite, among other things.

Due to its special relevance in space law, the use and allocation of the OSR is granted in co-ordination with the competent international authority for the management of bands and frequencies for telecommunications: the International Telecommunications Union (ITU). In Europe, the European Code of Conduct establishes the basic conditions for communications service providers, and Directive 2014/53/EU of 16 April 2014 harmonises the requirements that member states must meet in order to market radio equipment.

In this regulatory context, Spain has enacted the 2022 General Telecommunications Act (*Ley General de Telecomunicaciones* – LGT), approving the regulations on the use of the public radioelectric domain and establishing the internal legal regime for the use of radio frequencies by space operators. This Act repeals the previous 2014 Act and has been developed in some detail by Royal Decree 123/2017, which approves the regulations for the use of the public radioelectric domain.

Competent Governmental Entity in Spain for the Allocation and Supervision of the OSR

The LGT considers that the OSR is owned and administered by the state, as a public domain asset, and determines the Spanish sovereignty of the radio frequency bands when these involve use in the Spanish territory by state institutions or private individuals.

For the management of national OSR, the LGT created the Operators' Register, on which any operator intending to operate telecommunications networks must be registered. The requirements for the provision of networks and electronic communications services are regulated in Article 6.2 of the LGT. The Operator's Register is under the jurisdiction of the National Commission for Markets and Competition (*Comisión Nacional de Mercados y Competencia* – CNMC).

However, although the CNMC regulates and supervises compliance with the competition rules in the markets, including the regulated telecommunications market, it is not the competent authority to allocate frequencies or grant licences for the use of OSRs. This authority rests with the State Secretariat for Telecommunications and Digital Infrastructures (*Secretaría de Estado de Telecomunicaciones e Infraestructuras Digitales* – SETID), a government agency attached to the Ministry of Economic Affairs. SETID assigns the authorisations for the private use of OSR to space operators. The granting of the authorisation is conditional upon the following, among other requirements:

- providing a guarantee of EUR200,000;
- prior ITU authorisation for the use of the band requested; and
- proof of the financial solvency, technical ability and feasibility of the applicant's project.

SETID has six weeks from the date on which the ITU reserves the requested orbit-spectrum resource in favour of the Kingdom of Spain to decide on an application for the granting of licences. Once this period has elapsed without an express decision having been notified, the application for granting the licence shall be deemed to have been rejected.

It should be added that, in the event that the radiocommunications infrastructure includes a subordinate terrestrial network, the frequencies of this terrestrial network (other than the frequencies of space services) will not be included in the previous licence for the private use of the OSR, but it will be necessary to obtain another licence for their use in the “Terrestrial Segment”, regulated by the LGT.

Management and Co-ordination of Radio Spectrum Frequencies and Slots

SETID works closely with international (ITU), intergovernmental (ESA) and national (CNMC) bodies to ensure compliance with international agreements and regulations on frequency and orbital slot allocation. To this end, SETID develops National Frequency Plans in which it allocates specific frequency bands for different telecommunication services (mobile, radio, television, emergency services) according to the needs identified, in which the technical and operational conditions for the use of each frequency band are defined, including the maximum powers, and sets technical standards to be met by the equipment and systems that use these allocated frequencies (or for which their allocation is foreseen).

SETID is also responsible for controlling the use of the assigned spectrum by means of technologically advanced monitoring systems that detect non-compliance with the assigned

technical standards and conditions of use. This allows the detection of possible interferences. Non-compliance by operators with the technical standards and licence conditions that generate harmful interference leads to the application of the sanctioning regime provided for in the LGT (fines, suspension of licences, confiscation of the equipment causing the interference and issuing of corrective orders to prevent future infringements).

The CNMC supervises compliance with regulations in the telecommunications market from a free competition perspective. Its authorities include a sanctioning regime applicable to breaches or conduct that significantly affects competition or efficient use of the spectrum, and to anti-competitive practices or abuses of dominance in the sector. The seriousness of the non-compliance determines the application of sanctions (fines, cessation of activity of the offenders and publication of the sanctions).

Consultation and Conflict Resolution Mechanisms in Case of Interference

The LGT provides for a public consultation procedure on spectrum planning and assignment with the participation of relevant stakeholders, including telecommunications operators, government agencies and the general public. In relation to this mechanism, SETID announces the launch of a public consultation through its website and other communication channels, with detailed reference to studies, impact analysis of the plans and any other relevant information. Subsequently, SETID analyses the contributions of the participants and evaluates the comments received, concluding in a final report that is publicly accessible.

The LGT establishes SETID's mediation and arbitration procedures in the resolution of interference disputes:

- SETID and the CNMC can act as mediators in disputes between operators and between operators and end-users; and
- the parties can also call upon a neutral arbitrator appointed by SETID or an independent telecommunications expert, whose decision will be binding.

Finally, the LGT provides for a complaints procedures before the CNMC and SETID, respectively, in which operators and users must detail the nature of the interference and provide evidence. The CNMC or SETID, as appropriate, may initiate an investigation through technical inspections to assess the validity of the complaint. If the interference is confirmed, corrective measures are applied, which may include technical adjustments, fines or modifications to frequency allocation, and even orders forcing the responsible party to cease the activity causing the interference.

Management of Orbital Slots

Through Royal Decree 517/2024, the public enterprise ENAIRE was recently appointed as the sole service provider for Spanish U-Space areas. An Interministerial Commission is responsible for designating particular geographical zones such as U-Space, and the Spanish Aviation and Safety Agency (*Agencia Estatal de Seguridad Aérea* – AESA) is in charge of certifying and supervising U-Space service providers.

2.6 Role of the State in the Launching Process

The Spanish state acts mainly as a facilitator and user in the launch process. For the time being, Spain has no independent space access

capability, so its role in launching objects into outer space depends on the services provided by international partners, mainly ESA, whose spaceport is located in Kourou (French Guiana).

Spain's launch capacity is lacking for the following reasons:

- the high cost of launch activity;
- a national policy to promote the development of activity and participation by private operators has been initiated only very recently;
- Spain has always operated under the umbrella of ESA, participating in many of its space programmes; and
- the lack of development of a national space legal framework has slowed down the development of the space industry, generating legal uncertainty in the traffic of private operations and making private investment unattractive.

A recent example of this dependence on launch capability, including at a European level, has been the need for ESA and Europe to contract the US launch service provider "SpaceX" for the launch of four Galileo satellites into space from US territory. This operation had to be carried out through a private contract with SpaceX and a bilateral EU-US agreement to establish procedures for the security of EU classified information during the satellite launch campaigns.

In early October 2023, Spain demonstrated its ability to design and produce an entirely Spanish rocket and launch it from national territory. This milestone was made possible by the public-private partnership between the company PLD Space and the public authorities. MIURA-1 was launched from the Arenosillo spaceport (Huelva) and performed a suborbital flight.

The second phase of the rocket's reintegration (it was to be reusable) could not be carried out successfully, but this did not prevent the mission from being classified as a Spanish and European milestone. MIURA-5 is currently under construction and is intended to be launched from French Guiana.

2.7 Commitment to International Treaties and Multilateral Discussions

Spain has signed and ratified four of the space treaties; see 1.1 The “NewSpace” and Space Tech Economy.

COPUOS and the Conference on Disarmament

Spain has been a permanent member of COPUOS since 1994 and actively participates in the Conference on Disarmament.

In COPUOS, Spain plays a leading role in promoting the peaceful and sustainable use of space. It has actively participated in the development and adoption of space debris mitigation guidelines that seek to reduce the creation of new debris and manage existing debris to minimise the risk of collisions. Within COPUOS, Spain supports initiatives that promote international co-operation in space exploration.

Spain actively participates in the UN Group of Governmental Experts on Transparency and Confidence-Building Measures in Space Activities; these measures include the disclosure of information on space launches and the promotion of transparent practices among nations. It should be stressed that Spain has implemented a Registry of Space Objects that complies with the 1974 Convention on Registration of Objects Launched into Outer Space, ensuring that all satellites and objects launched by Spain are properly registered and notified.

In the Conference on Disarmament, Spain normally takes a stand against the militarisation of space and supports the prohibition of weapons of mass destruction in outer space, promoting the adoption of international treaties and agreements to strengthen space security and prevent an arms race in space.

Spain actively participates in groups of governmental experts that study and propose measures for the prevention of an arms race in space. It contributes with research and proposals based on international law and best practices.

Incorporation of International Instruments in the Spanish Legal System

Spain has a historic track record of compliance with the international treaties to which it is a party. Furthermore, from the moment of their entry into force, international treaties have a higher hierarchy in the Spanish legal system than domestic laws and regulations, which must be interpreted and applied in accordance with such international instruments. Spanish courts and authorities also regularly apply the provisions of international treaties.

Liability Rules

The Treaty on International Liability for Damage Caused by Space Objects has been directly applicable in Spain since its ratification in 1980. Articles VI and VII of the Treaty attribute the liability for damage caused to third parties by space objects either to the states themselves, or jointly and severally to the states and their private operators.

Civil liability for damages on the part of states consists of the action for recovery by states against private entities within their own jurisdiction. In this matter, the Spanish legal system lacks a specific civil liability regime for space

activities. However, the usual practice is based on practices developed at the international level, customs and procedures, and certain provisions of the 1980 Insurance Contracts Act.

The future Spanish Space Act is expected to provide some detailed provisions on this matter.

Application of the “Due Regard” Principle

Article IX of the OST provides for the duty of due regard for state parties during their conduct of space activities, according to which the corresponding interests of all other state parties shall be considered, and appropriate measures for avoiding harmful interference shall be taken.

2.8 Insurance and State Measures on Liability for Damages

Space Insurance in Spain and Insurance Requirements for Space Operators

Spanish legislation does not yet regulate or establish the mandatory requirement of insuring a space object prior to its launch and once it has been placed in orbit by its owners. However, the high participation of the private sector in space activities means that the same practice defines an international framework of customs and practices in the field of space insurance. An alternative, often used in practice, is that the operator of the space object adheres to the insurance policy of the provider of the launching service.

Risk Assessment and Determination of Insurance Premiums

In Spain, the lack of a national space law causes legal uncertainty for insurers who, not being sufficiently familiar with this new industry and its practices, are hesitant to develop the necessary insurance products. Until a proper regulatory framework is in place, insurers will continue to assess the risks and determine insurance premiums in accordance with general market prac-

tice throughout the world (ie, using the “Probable Maximum Loss” method originated in the USA or the “Modelled Insurance Requirement” of the UK space regulation).

Under ESA’s public-private contracting system with private operators, such operators can benefit from the agreement between ESA and its insurance companies in the framework of collaboration in European space programmes.

3. Rules Applicable to Space Operators’ Activities

3.1 General Rules on Space Activities

Subject to the provisions of international conventions to which Spain is a party, and due to the lack of specific space regulation in Spain, activities to be carried out in space (healthcare, life sciences, agri-food, data processing, etc) are currently subject to and governed by the same rules and regulations as if such activities were to be carried out on Spanish territory.

3.2 Principles of Non-interference and Prevention of Harmful Interference

No specific regulations relating to non-interference with other spacecraft, space missions or space-faring entities have yet been approved. Therefore, these issues would have to be analysed and solved in accordance with the applicable international conventions and international customary law.

3.3 Operators’ Responsibilities

Obligations of Operators in Outer Space and in Launch and Re-entry Activities on Earth

Since Spain has not developed a specific law on space, the behaviour of operators in space is based on the obligations derived from international treaties and customary law, as well as

the general obligations applicable to Spanish enterprises.

ESG Guidelines for Space Activities

In the field of space debris mitigation, operators under Spanish jurisdiction should follow the COPUOS Space Debris Mitigation Guidelines and ESA's European Code of Conduct on Space Debris Mitigation, which, among other issues, oblige launch service operators and developers to plan the re-entry of their space objects in a safe manner and to implement follow-up and subsequent recovery measures if such objects must remain in orbit. These guidelines are not an obligation for private operators in Spain; they are recommendations issued by international or intergovernmental organisations of which Spain is a member.

Specific Intellectual Property Rules Applicable to Space Activities and Assets

In Spain, intellectual property protection is regulated by the Intellectual Property Act, approved by Royal Legislative Decree 1/1996. Industrial property is regulated by the Patent Act (Law 24/2015), the Trademark Act (Law 17/2001) and the Law on the Legal Protection of Industrial Design (Law 20/2003), together with their respective regulations.

None of these laws provides for their specific application in outer space or to outer space activities. At the European level, there is also no unitary regulation for the protection of industrial property in outer space, although there are Community regulations applicable in the European territorial scope, such as Regulations (EU) 1257/2012, on protection by means of unitary patents, and 2015/2424, on the European trade mark.

On the International Space Station (ISS), on the other hand, there is a regime of jurisdictional distribution over inventions under development on the ISS. Article 21 of the Intergovernmental Agreement on the International Space Station provides that any invention activity on the ISS is deemed to take place in the territory of the partner state where the flight element is registered. Thus, the applicable jurisdiction is the state of registration, although the inventor may apply for a patent in several countries.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights Spatial Resources

One of the characteristics of NewSpace is the regulation of the exploitation of resources on the Moon and other celestial bodies. The US and Luxembourg are leading this initiative with national laws that allow the appropriation of resources extracted by their citizens.

Spain has not adopted a national law on space activities and is therefore governed by the Space Treaties, with the exception of the Moon Agreement, which Spain has not ratified.

Space Resource Rights and the Principle of Non-appropriation

Until a domestic Space Act is approved, the issue surrounding the principle of non-appropriation could be debatable in Spain.

On the one hand, the Moon Agreement states that the Moon's resources are the common heritage of mankind, and requires an international regime for their orderly and equitable exploitation. Non-ratification or non-accession to the Moon Agreement is sometimes understood as

a refusal to consider the Moon as the common heritage of mankind and to depart from international law by regulating commercial resource exploitation activities on the Moon and other celestial bodies themselves. On the other hand, the Artemis Agreements (13 October 2020), to which Spain has been a party since 2023, allow the extraction and use of resources on the Moon and Mars, promoting safe and transparent activities through the creation of “safe zones”.

The Space Treaty, ratified by Spain, does not establish the nature of the Moon, its resources and those of other celestial bodies as the “common heritage of mankind”, but rather as the “concern of all mankind”. However, the wording of Article II of the Space Treaty establishes the principle of “non-appropriation” of outer space and celestial bodies. It could thus be argued that Spain is bound by this provision.

4.2 Granting of Rights to Space Resources

No administrative authority has yet been designated in connection with resource rights in outer space, although the AEE is expected to be named as such. Potential overlaps with other states will have to be solved in accordance with the principles and procedures contemplated in international instruments.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

The duty to protect sustainable access to space is enshrined in Article IX of the Space Treaty. However, the international community has only recently shown concern for the mitigation of space rights, and the current regulatory frame-

work is outdated and insufficient for today’s reality of space debris.

In this regard, international organisations such as COPUOS and ESA have promulgated their own Space Debris Mitigation Guidelines (see **2.7 Commitment to International Treaties and Multilateral Discussions**). As a member state of the European Union, a founding state of ESA and a member of COPUOS, Spain has adopted all the guidelines and recommendations that constitute customary law.

Currently, there are also no specific regulations in Spain or the EU on critical space minerals.

5.2 Climate Change and Space Activities

At the 2023 Seville Space Summit, the Zero Debris Charter was published and opened, which is aligned with the space sustainability goals for 2030. At the same summit, the “Space for a Green Future” initiative was also presented, with the intention of reducing CO2 in large cities and favouring sustainable mobility.

In November 2023, the Council of Ministers in Spain approved an agreement increasing the budget line for space debris monitoring expenditure through the AEE by EUR4 million.

In this way, Spain aims to comply with the Code of Conduct on Space Sustainability, fulfilling four particularly important practices contained therein:

- mitigating the risk of collision in orbit;
- minimising the threat of non-transportable debris;
- preserving human life in space; and
- limiting the impact on optical astronomy.

Finally, from an EU point of view, space debris mitigation is sought through Space Traffic Management by the Global Satellite and Operators Association, defined as “the means and standards for accessing, operating in and returning from outer space in a safe, sustainable and secure manner”.

Furthermore, in February 2022, a proposal for a Regulation on secure space connectivity from the European Union was presented, resulting in the “Conclusions of the EU Competitiveness Council on Space Traffic Management”.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

Spain does not yet have a special tax regime for space activities. Therefore, the general provisions of the 2014 Corporate Income Tax Act, the 1992 Value Added Tax Act, etc, are relevant.

6.2 Tax Incentives for Space Investors

Spanish provisions on corporate income tax establish certain tax deductions for research, development and technological innovation activities, subject to a binding assessment by the State Tax Authority (AEAT). Operators must apply to the AEAT for a prior assessment of R&D expenses before they are incurred. These deductions vary between 25% and 42% of the R&D expenditure. Tax deductions are also available for technological innovation – ie, expenses invested in the materialisation of new products, schemes and designs, the creation of non-marketable prototypes and pilot projects.

These regulations provide a favourable fiscal framework that encourages the development of advanced technology and space projects in

Spain, thus supporting growth and innovation in the aerospace sector.

6.3 Taxation on Sale or Transfer of Space Assets

Given the international nature of most space assets and players, the tax implications relating to the transfer or sale of space assets need to be analysed on a case-by-case basis. In general terms, VAT exemptions may be applicable, although this needs to be verified in accordance with the specific transaction structure.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

NewSpace in Spain is growing, driven by innovative start-ups and supportive government policies. There is increasing interest from investment funds and financiers, which see opportunities in the space sector. The evolution in fundraising is positive, with an increase in investments and the creation of specialised incubators and accelerators. Initiatives such as the ESA Business Incubation Centre (BIC) programme in Spain facilitate access to funding and technical support, promoting a dynamic and attractive ecosystem for new space companies.

Venture capital funds in Spain currently investing in space activities include:

- K Fund;
- Samaipata Ventures;
- Adara Ventures;
- Bullnet Capital;
- Inveready; and
- Caixa Capital Risc.

7.2 Finance Sources for Space Activities

The main source of funding for space activities in Spain still comes from public funds, especially subsidies.

On 15 May 2024, the Ministry of Science, Innovation and Universities (MICIU) published the 2024 call for the Space Technology Programme (PTE), managed by the CDTI with the collaboration of the AEE. Endowed with EUR70 million from the PERTE, the call will finance – with up to EUR30 million – projects for the development of space products and processes, as well as technologies with high disruptive potential. The remaining EUR40 million will be earmarked for advanced projects that boost the maturity level of space technologies; of this budget, EUR16 million are earmarked for small projects.

Secondly, the funding channels of private companies in the framework of space projects with ESA and other public-private partnerships between government and private companies also account for a high percentage of funding in the Spanish space industry.

Financing through venture capital firms, crowd-funding and private investment rounds is also on the rise. For example, PLD Space, which started as a start-up, has raised EUR78 million from private investors and EUR42 million from the PERTE programme.

7.3 Attracting Investment for Space Activities

The main fundraising initiative in Spain is the creation of specialised incubators and accelerators, such as ESA BIC in Spain, located specifically in the cities of Barcelona and Madrid. Since the seat of the AEE is in Seville, similar initiatives

can be expected to take place there. In addition, the tax incentives discussed in **6.2 Tax Incentives for Space Investors** and the support from the central and regional governments through proactive policies intend to encourage industry growth and investment in space technology.

7.4 Foreign Investment in Space Activities

Two main aspects should be considered when it comes to foreign investments in Spain.

- Foreign investment regulations: in line with European regulations, the 2023 Foreign Investments Act contemplates certain restrictions on foreign investments in Spanish critical technologies or infrastructure (including space technologies and infrastructures) due to national security concerns. This type of investment requires prior governmental approval.
- Export controls on dual-use products and technologies: similarly, the export of products and technologies that are classified as dual-use products is subject to strict export controls and, under certain circumstances, international sanctions. Space assets and technology certainly fall under this category, so the relevant regulations need to be taken into account.

7.5 Role of Securities Markets in Space Financing

Unlike in other countries, the Spanish securities markets are not a huge source of financing, except for a limited number of companies. Stock exchanges from other countries (USA, the UK, the Netherlands, etc) play a larger role in this respect.

Trends and Developments

Contributed by:

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AUGUSTA ABOGADOS

AUGUSTA ABOGADOS is a business law firm specialising in corporate and commercial law, tax, restructuring, labour law, air and space law and procedural law, amongst other areas. The rapid development of space-related technologies, collaboration models between private and public actors, the increasing number of private projects, and the availability of private financing sources contribute to a novel scenario. The complexity of legal requirements and the approval of new regulatory measure are growing rapidly, driven also by the need to protect ex-

isting know-how and the value of investments. Building on its accredited experience in the areas of aviation and drones law, in 2021 **AUGUSTA ABOGADOS** made the strategic decision to develop a new space economy law department, to advise clients and public authorities on legal matters such as the financing of space assets and the launching of satellites, providing guidance on the regulation of satellites and associated frequencies, and monitoring space law legislation and regulation.

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Space Law in Spain: an Introduction *Spain's historical commitment to the development of space activities*

Spain has made political and economic efforts to be seen as a reliable player in the field of outer space since the very early days of the space age, in the 1960s. For instance, Spain entered into a close collaboration with the United States of America through programmes such as the Mercury project and the Apollo programme. This long-standing co-operation has been maintained over decades and can be visualised through the operation of the Deep Space Communications Complex or the Space Centre at the National Institute of Aeronautic Technology (*Instituto Nacional de Técnica Aeronáutica*, or INTA) facilities in Madrid.

Since the creation of the European Space Agency (ESA) in 1975, Spain has also actively participated as a founding partner in European initiatives, including the launch of the first Spanish telecommunications satellite, "HISPASAT 1A", in 1992 and projects of such importance as Galileo and Copernicus. The essential contribution of the Spanish company GTD, which has developed the software that controls the Ariane 6 rocket, is well known in the space community.

Today, the Spanish space sector is mature, with a turnover of almost EUR1 billion and investment of EUR180 million in R&D&I alone. In the European aerospace industry, Spanish companies are among the few with the capacity to lead complete space systems due to the solid structure of the private sector, made up of medium-sized independent companies that have developed important technologies and components that are successfully used in the commercial and institutional markets.

Creation of the Spanish Space Agency in 2022

As part of the Spanish government's efforts to recover from the economic downfall caused by the COVID-19 pandemic and within a wider European effort to develop the green economy and hi-tech projects, in March 2022 the Strategic Project for Aerospace Economic Recovery and Transformation (PERTE) was approved to mobilise nearly EUR4.5 billion to boost R&D&I in the aerospace sector. In June 2022, the Spanish Council of Ministers approved the creation of the Space Council (*Consejo del Espacio*), an inter-ministerial group in charge of drawing up the by-laws and initial plan of a Spanish space agency, to be created with the main objective of ensuring the development and implementation of a coherent national space policy, as well as optimising

the management of economic resources dedicated by Spain to space activities.

Through Act 17/2022, the Spanish Space Agency (*Agencia Espacial Española*, or AEE) was created in September 2022, based in Seville. This newly created entity will be the primary actor in co-ordinating and promoting Spain's public and private space activities, thereby solving the historical handicap created by having different governmental agencies with overlapping functions. It should be noted that the AEE has a dual nature, as it takes care of fostering technological development as well as handling national security concerns. Therefore, the AEE has been given authorities corresponding to different governmental bodies – more specifically, to the Ministry of Science and Innovation and the Ministry of Defence.

With an initial budget of EUR500 million, the AEE has been given broad powers to co-ordinate and promote space activity in Spain, within the framework of the European project led by the European Space Agency (ESA). The new AEE should promote space activities in terms of technological development and the use of space in areas such as security, Earth observation, geolocation and communications.

With the setting up of the AEE, Spain is on a par with neighbouring countries with similar organisations. Due to the size of its economy, Spain cannot aspire to reach the investment levels of the major players, but it must try to compete – and collaborate – with those of the closest countries that already have similar agencies, such as Germany, the United Kingdom, France, Sweden and Italy.

The AEE's first actions have been aimed at representing the Spanish position within ESA and

NASA, including signing the Artemis Agreements. The AEE is currently working on a strategic space plan to define the particular commitment of the Spanish space industry and the ways in which Spanish players can make scientific and economic use of space.

From the legal perspective, one of the most important tasks allocated to the AEE and the one that will define a fundamental legal framework is the authority to elaborate a proposal for a National Space Policy and a preliminary draft of a National Space Act. Therefore, the next milestones that the AEE has set for itself are to draw up a specific and appropriate regulatory framework for space activity in Spain. At this point in time, no preliminary draft has yet been published, so development in this respect will need to be monitored closely.

The second important development relates to Spain joining the Artemis Accords.

Spain joins the Artemis program

With the creation of the AEE, Spain committed itself to develop space sector opportunities and to join NASA's Artemis Agreements. This took effect in a solemn ceremony on 30 May 2023 and positions Spain among the contributing states in the exploration of outer space, the Moon and other celestial bodies, beyond its participation in the ESA. Spain became the 25th country to sign the Artemis Accords.

The specific scope of Spain's participation will be geared towards promoting scientific co-operation within the framework of the Artemis program, with various initiatives for advanced research and the exchange of expertise in fields such as quantum research or neutrino experimentation. Spain will also play a role in the

construction of the rovers for the exploration of Mars.

The PLD Space MIURA Programme

Spain recently showed that it is capable of launching objects into space on its own. Spanish company PLD Space has successfully developed a micro satellite launcher with the MIURA-1 suborbital rocket, which was successfully launched from the Huelva spaceport in October 2023. As a next step, PLD Space is working on launching the MIURA-5 reusable rocket from Kourou in French Guiana. This project has a strategic nature not just for Spain but also for ESA, because the European space industry is currently dependent on launchers controlled by non-European nations. The public support for this project is therefore significant.

The next step – towards a national space act

The situation outlined above shows the progress made in Spain and the commitment towards further development of the space industry. However, like many other countries, Spain still lacks a proper legal framework that assists all stakeholders (government, private industry, citizens) in achieving this goal. As explained, one of the very first tasks that the AEE must tackle is the promotion of a national space act that addresses the current needs and challenges, while fully respecting Spain's obligations towards the international community under the international conventions.

A preliminary draft was submitted back in 2014, and may well be used as a starting point. However, the situation has changed in many respects since then, and it would not be prudent to anticipate expectations on that basis. It is likely that we will still have to wait for a while until the draft of the new Space Act sees the light. What seems certain, though, is that the Spanish legal community is currently eager to support in overcoming these challenges.



Law and Practice

Contributed by:

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Contents

1. Global Trends p.223

1.1 The "NewSpace" and Space Tech Economy p.223

2. Existing Legal and Regulatory Framework p.224

2.1 Characteristics of the Space Industry p.224

2.2 Legal System and Sources of Space Law and Regulation p.225

2.3 Role of the State in Space Law and Regulations p.226

2.4 Role of the State in the Licensing Process for Space Activities p.227

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.230

2.6 Role of the State in the Launching Process p.231

2.7 Commitment to International Treaties and Multilateral Discussions p.231

2.8 Insurance and State Measures on Liability for Damages p.232

3. Rules Applicable to Space Operators' Activities p.233

3.1 General Rules on Space Activities p.233

3.2 Principles of Non-interference and Prevention of Harmful Interference p.234

3.3 Operators' Responsibilities p.234

4. Ownership of Extraterrestrial Resources p.235

4.1 Nature of Space Resource Rights p.235

4.2 Granting of Rights to Space Resources p.236

5. Environmental Protection and Impact on Climate Change p.236

5.1 Environmental Protection in Space p.236

5.2 Climate Change and Space Activities p.237

6. Taxation of Space Activities p.238

6.1 Tax System for Space Activities p.238

6.2 Tax Incentives for Space Investors p.238

6.3 Taxation on Sale or Transfer of Space Assets p.238

7. Investment and Financing in Space Activities p.238

7.1 Impact of "NewSpace" p.238

7.2 Finance Sources for Space Activities p.238

7.3 Attracting Investment for Space Activities p.239

7.4 Foreign Investment in Space Activities p.240

7.5 Role of Securities Markets in Space Financing p.240

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Stephenson Harwood LLP is a law firm with over 1,300 people worldwide, including over 200 partners. The firm is committed to achieving the goals of its clients – listed and private companies, institutions and individuals. The firm assembles teams of bright thinkers to match its clients' needs and give the right advice from the right person at the right time. Dedicating the highest calibre of legal talent to overcome the most complex issues, Stephenson Harwood delivers pragmatic, expert advice for real-world

problems. The firm's headquarters are in London, with eight offices across Asia, Europe and the Middle East. In addition it has forged close ties with other high quality law firms and an integrated local law capability in Singapore and the PRC. Stephenson Harwood is active in the space sector. In 2021, Stephenson Harwood advised Seraphim Space Investment Trust Plc, the first London listed space fund, on its GBP178.4 million IPO on the LSE.

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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

The Space Treaties

The UK is party to the following foundational space treaties:

- 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 (the Outer Space Treaty or OST);
- the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968 (the “Rescue Agreement”);
- the Convention on International Liability for Damage Caused by Space Objects 1972 (the “Liability Convention”);
- the Convention on Registration of Objects Launched into Outer Space 1975 (the “Registration Convention”); and
- the Constitution and Convention of the International Telecommunication Union 1992 (the “ITU Convention”).

In common with most major spacefaring nations, the UK is not a party to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the “Moon Agreement”). The UK was, however, one of the founding member nations to sign the Artemis Accords established by NASA.

Current Domestic Legislation

The UK was one of the first nations to implement a domestic space law: the Outer Space Act 1986 (OSA). Since 1986, the UK has continued to develop its domestic legal and regulatory framework. There are three current sources of space law in the UK’s domestic legislation:

- The OSA: The OSA as amended by the Deregulation Act 2015 governs the outer space activities of UK nationals (legal and natural) from overseas, including in the British Overseas Territories. The OSA does not apply to activities carried out from the UK.
- The Space Industry Act 2018 (SIA): Since 2018, the SIA has governed the space activities, sub-orbital activities and associated activities in the UK by UK or foreign nationals (legal and natural).
- The Air Navigation (Amendment) Order 2021 (ANO): The ANO has limited relevance. It applies to activities carried out in the stratosphere only (ie, up to approximately 50km above the earth).

The SIA is supplemented by the following regulations:

- the Space Industry Regulations 2021 (SIR), which enable the licensing and regulation of spaceflight activities, spaceports, and range control services in the UK;
- the Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations 2021, which establish a spaceflight accident investigation body and make provision about the conduct of accident investigations; and
- the Space Industry (Appeals) Regulations 2021, which outline the decisions made by the regulator that may be appealed by a licence applicant or licence holder, plus create a decision-making body to hear appeals.

With regard to the licensing of space activities, the UK’s domestic legislation is supplemented by guidance issued by the UK’s space regulator, the Civil Aviation Authority (CAA). Much of this guidance takes the form of Civil Aviation Publication (CAP) documents. These include the Regulator’s Licensing Rules, set out in CAP

2221, which specify how to apply for and renew launch operator, spaceport and range control licences under the SIA.

Anticipated Domestic Legislation

In line with its ambition of facilitating the rapid growth of the UK's space industry, the UK government has carried out a series of consultations and reviews to consider, among other things, how the UK's space legislation, regulatory and licensing regimes are functioning, and to come up with proposals for how these can be improved (see **2.2 Legal System and Sources of Space Law and Regulation**). On 22 May 2024, the UK's then Prime Minister Rishi Sunak announced that a general election would be held on 4 July 2024 with Parliament to be dissolved on 30 May 2024. This had two effects on the UK's domestic legislative programme for space.

First, all bills that were progressing through the Houses of Parliament at that time, but which had not yet received Royal Assent and therefore become law, were discarded. This included the Space Industry (Indemnities) Bill (see **2.8 Insurance and State Measures on Liability for Damages**).

Second, it created uncertainty concerning what further space legislation, if any, the next UK government might introduce. None of the election manifestos published by any of the major political parties prior to election day contained any specific detail concerning the space industry. This lack of detail perhaps reflected the fact that the space industry was not a priority for the general election; it does not, however, indicate that the new Labour government will disregard the results of the various recent reviews and consultations carried out in respect of the aviation industry (see **2.2 Legal System and Sources of Space Law and Regulation**).

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry The UK Space Industry Today

Having possessed domestic space legislation since 1986, the UK has one of the most established space industries around the world. It is estimated that in the last year the sector has grown by 15% and has contributed GBP5.7 billion to the UK's GDP. As of March 2024, 48,000 people were directly employed in the space industry and, after the USA, the UK is currently the biggest single recipient of all private investment in the global space sector, receiving 17% of all such investment in 2022.

The UK possesses several "clusters" located around the country that are home to groups of NewSpace companies. The most notable of these is located on the Harwell Science and Innovation Campus in Oxfordshire, which is home to the headquarters of the UK Space Agency (UKSA), the European Centre for Space Applications and Telecommunications (ECSAT) of the European Space Agency (ESA), and over 100 different NewSpace companies employing over 1,000 people. The range of companies involved in NewSpace in the UK is vast: it includes large multinationals such as Lockheed Martin and Airbus Defence and Space, established industry leaders like Astroscale, and many small start-ups that have been assisted by the various space accelerators and catapults operating in the UK.

The UK's Ambitions

The UK government expressly recognises the importance of NewSpace and the opportunities it presents for further development. In particular, the UK government recognises the potential offered by the UK's unique geographic position

and its stated ambition is to establish the UK as the leading provider of commercial small satellite launches in Europe by 2030. To achieve this ambition, the UKSA is working closely with a range of companies located across the UK to develop the spaceports needed to facilitate launch, to develop the space assets and technologies that will be launched from them, and to develop the necessary supporting infrastructure.

In January 2023, Virgin Orbit carried out the first attempt at a horizontal launch from Spaceport Cornwall in Newquay, and in December 2023 the CAA issued the first licence for vertical launch in western Europe to SaxaVord Spaceport in Orkney followed by a range control licence in April 2024. It is anticipated that the first vertical launch from SaxaVord Spaceport will take place in Q3 of 2024. At the same time, the UKSA is working closely with other would-be UK spaceports, including Sutherland Spaceport and Snowdonia Aerospace Centre, to develop the UK's launch capacity elsewhere.

The UK government has carried out several consultations and reviews involving a range of stakeholders from across the NewSpace industry (see **2.2 Legal System and Sources of Space Law and Regulation**). That work has informed several strategy papers published by the UK government to outline its plans for developing the industry. The most recent of these are the National Space Strategy published in 2021 and updated in 2023 (the “National Space Strategy”) and the Space Industrial Plan published by the Department for Science, Innovation and Technology (DSIT) and the Ministry of Defence in March 2024 (the “Space Industrial Plan”).

2.2 Legal System and Sources of Space Law and Regulation

The Jurisdiction

The UK contains three separate legal jurisdictions: England and Wales, Scotland and Northern Ireland. England and Wales comprise a common law jurisdiction. The jurisdictions of Northern Ireland and Scotland are mixed, incorporating features of both common and civil law traditions.

As described in **1.1 The New Space and Space Tech Economy**, regardless of the specific jurisdiction within the UK, space activities carried on within the UK either by UK or foreign nationals (legal or natural) are governed by the SIA and accompanying regulations.

Case Law

There is very little publicly available UK case law applicable to space law. This reflects the fact that the growth of the NewSpace industry in the UK is a relatively recent phenomenon, with correspondingly limited opportunities for space-related disputes between private entities, and that most disputes relating to space are currently dealt with privately through arbitration.

The Future Legal Regime

In recent years, the UK government has carried out several consultations and published several reviews considering the UK's domestic legal and regulatory regimes for space. The consultations and reviews have been carried out by various government and parliamentary bodies, including the UKSA, the Department for Transport (DfT), DSIT and its associated House of Commons' Science, Innovation and Technology Committee (SITC), and they have typically featured heavy involvement from industry. The purpose of this work has been to identify weaknesses in the current system, propose possible solutions and

ideas for improvement, and inform the national space strategies and plans identified in **2.1 Characteristics of the Space Industry**.

Three of the most significant reviews include:

- the SITC's report on "UK space strategy and UK satellite infrastructure: reviewing the licencing regime for launch" (the "SITC Report"), published in July 2023;
- the UKSA's "Consultation on Orbital Liabilities, Insurance, Charging and Space Sustainability" (the "Liabilities Consultation"), which closed on 5 January 2024; and
- DSIT's Space Regulatory Review (the "Regulatory Review"), published in May 2024.

The SITC Report identified several areas for improvement within the UK's launch licencing regime in the aftermath of Virgin Orbit's failed attempt at the UK's first horizontal launch in January 2023. After consulting with the industry, SITC identified that key areas for improvement included, among other things: (i) increasing transparency and reducing duplication to streamline the licensing process; and (ii) developing a variable limits approach to third-party liability insurance for space operations (see **2.8 Insurance and State Measures on Liability for Damages**). Overall, however, SITC concluded that the regime was working well and that the CAA was getting to grips with it as quickly as possible.

The Liabilities Consultation featured several interesting proposals from the UKSA, focussing primarily on insurance but also encompassing space sustainability as well. As with the SITC Report, the Liabilities Consultation contained a proposal relating to variable liability limitations (see **2.8 Insurance and State Measures on Liability for Damages**) and in respect of the dis-

cretionary cap on liability provided for by Section 12(2) SIA. This reflects the significance of the issue of liability to the industry. In addition, the Liabilities Consultation also contained proposals for reducing fees for operators' licences, as well as for boosting space sustainability through a "Space Sustainability Roadmap". The UKSA is currently considering the results of the Liabilities Consultation with a view to providing its legislative proposals in 2024 and implementing those proposals in 2025.

The Regulatory Review summarised the current position of the UK's regulatory and legal regimes and considered how it can be improved to assist the UK in achieving the National Space Strategy and the Space Industrial Plan, again with substantial input from industry. The Regulatory Review also included the DfT's review of the first five years of the SIA. While it concluded that the regime is functioning well, the Regulatory Review stated there is a greater need for clarity, certainty and confidence in order to deliver the desired growth of the UK's space industry. To achieve this, it identified seven priority regulatory outcomes, supported by 17 recommendations, to be put into practice by a cross-government implementation team. It remains to be seen whether any legislative changes will result from the Regulatory Review.

2.3 Role of the State in Space Law and Regulations

The DfT and DSIT

The two government departments that are most concerned with the facilitation of the commercial development of space in the UK are the DfT, which has specific responsibility for commercial spaceflight, and DSIT. These departments are responsible for working with the relevant UK government ministers, including the Space Minister, by developing and implementing policy on

space, including the development of NewSpace, and for dealing with space on a practical and administrative level.

Additionally, the Foreign, Commonwealth & Development Office (FCDO) is likely to play an important role in facilitating the development of the UK's launch capability and NewSpace in general. The FCDO is responsible for negotiating airspace access with other nation states, which is particularly important given the launch trajectories from the UK. More generally, the FCDO provides the UK with the ability to forge partnerships and bilateral agreements with other space-faring nations (see **2.7 Commitment to International Treaties and Multilateral Discussions**).

The UKSA

The UKSA is an executive agency of DSIT. In 2010, it succeeded the British National Space Centre as the co-ordinator of the UK's space programme. It bears responsibility for the UK's civil space programme and plays an active role in implementing the National Space Strategy.

The UKSA is now both a participant in the UK's space industry and a facilitator of it. As participant, the UKSA is responsible for the UK's membership of the ESA and it is involved in a wide variety of space missions. By way of example, the UKSA is heavily involved in the ESA-led Traceable Radiometry Underpinning Terrestrial- and Helio-Studies (TRUTH) programme. As facilitator, the UKSA plays an important role in developing NewSpace and has developed the "LaunchUK" programme designed to grow the UK's satellite launch capability and spaceflight industry. As part of this, the UKSA directs funding to the areas where it is most needed, assists the development of new companies through its accelerator programmes, works with the developing spaceports located across the UK and

seeks to attract foreign companies to move to the UK (see **7.2 Finance Sources for Space Activities**).

The CAA

Article VI OST provides that state parties to it bear international responsibility for activities carried out in outer space by non-governmental entities. The UK is therefore responsible for space activities carried out by UK nationals.

Since 2021, that responsibility has been exercised by the CAA as the UK's space regulator. The CAA is responsible for overseeing the SIA and the OSA. This includes overseeing applications for spaceports, launch, return, range control and in-orbit activities, as part of which the CAA is chiefly concerned with ensuring public safety. The CAA engages closely with applicants and supports them during the process, including by publishing detailed guidance on how it will apply and interpret the relevant legislation. After licencing is complete, the CAA continues to monitor space operators, and it has the power to administer fines for breaches of the relevant legislation and of any conditions contained within the relevant licence.

2.4 Role of the State in the Licensing Process for Space Activities

The SIA, the OSA and the ANO

The SIA and accompanying regulations govern the licensing regime for space activities to be carried out from the UK. The OSA governs the licensing regime for space activities to be carried out abroad. In each case, the process is overseen by the CAA. The ANO governs activities carried out no higher than the stratosphere. The CAA's approach is to align the regulatory approach taken with respect to each regime as much as possible.

Space Activities Carried Out in the UK

Under Sections 3(1) and 3(6) SIA, it is an offence to carry out space activities or to operate a spaceport within the UK except under the authority of a licence issued by the CAA. Pursuant to Section 53 SIA, a party that carries out space activities or operates a spaceport without a licence may be liable to a fine or a prison sentence.

Section 1(4) SIA defines a “space activity” as including launching or procuring the launch or returning any space object (or aircraft carrying a space object), operating a space object, and any activity carried out in outer space.

The CAA is responsible for issuing “operator licences” and “spaceport licences”. Spaceport licences cover the operation of spaceport facilities within the UK, while operator licences cover the following activities:

- launch – ie, launching space objects or launch carriers from the UK;
- return – ie, the return of space objects to the UK following re-entry from outer space; and
- orbital operations – ie, operating a satellite or spacecraft in outer space from the UK.

The CAA also grants “range control” licences, which govern the provision of range control services in respect of licensed spaceflight activities (ie, launch or return) in a specified location (typically a spaceport). The UK is unusual in this respect because, in the majority of other jurisdictions, range control services are reserved to the state and cannot be undertaken by private entities.

Per Article II of the Registration Convention, the CAA maintains a publicly accessible register of the different licences it has granted. This records

the name of the entity and the date when the licence was issued, and allows the public to view the terms of each licence and the accompanying oversight and monitoring plan issued by the CAA.

The Licensing Process

Applications for licences must be made to the CAA. Applicants must show that they comply with the relevant requirements for each licence as set out in the SIR and the Regulator’s Licensing Rules. There is no application fee for a launch, return, range or spaceport licence, but there is a set fee of GBP6,500 for each orbital operator licence.

To assist applicants in this process, the CAA has published extensive guidance in several CAP documents, which are updated regularly. The most important of these is CAP 2209: “Applying for a licence under the Space Industry Act 2018”. These documents help applicants navigate the necessary forms and ensure that they provide the CAA with the necessary information to allow them to determine applications as quickly as possible.

When considering applications, the CAA will often work closely with other regulatory bodies. In cases where the applicant is seeking to operate a satellite in space and therefore needs to obtain an orbital position and a satellite filing, this will include the Office of Communications (see **2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots**). In most cases, the CAA will also liaise with various environmental agencies to assess the environmental impact of the proposed activity.

Licence applications are made using an online form, which is dictated by Section 18 SIR. The form requires applicants to provide details of

the applicant's legal status and their financial and technical resources. Depending on which type of licence an applicant is seeking, the form also requires additional information regarding the activities that the applicant is planning to perform, and it also requires applicants to provide information about the individuals who will be holding "prescribed roles" (such as "launch director") in respect of those activities.

Pursuant to Section 8 SIA, the CAA may only grant a licence if it is satisfied that doing so will not impair the UK's national security, is not inconsistent with the UK's international obligations, and is not contrary to the national interest. It must also be satisfied that the applicant has sufficient resources to carry out the activities in question, and that the applicant (and the individuals holding "prescribed roles") is a fit and proper person. The criteria for assessing these considerations are set out in Chapter 1 of the SIR.

Applicants for launch, return and spaceport licences must also provide a safety case with their applications, which must demonstrate to the CAA that the applicant has identified all major hazards that may arise from the planned activities and that the applicant has taken the necessary measures to ensure that risks are kept as low as reasonably possible. This includes a cybersecurity plan (see **3.1 General Rules on Space Activities**).

There is no set length for the licence application process. However, the CAA advises that applications should be made at least six months before the licence in question is needed. The CAA also advises that applicants should contact it prior to making an application in order to apprise the CAA of its plans to obtain specific guidance as to how each stage of the application works.

If an application is refused, Section 60 SIA provides that applicants can appeal the CAA's decision following the procedure set down in Schedule 10 to the SIA and the Space Industry (Appeals) Regulations 2021. The CAA has provided guidance as to how the appeal process operates for decisions made under either the OSA or the SIA in CAP 2216.

Registration of Space Objects

Article II of the Registration Convention requires launching states to maintain a registry of space objects to provide information relating to such space objects to the United Nations. This obligation is reflected in Section 7 OSA and Section 61 SIA. In relation to each launch, the CAA is required to register the date of the launch, the spaceport at which the launch took place, the nature of the spacecraft involved, and the purpose of the launch. The CAA maintains this register on its website. It also maintains a "supplementary" register, which sets out details of space objects covered by OSA and SIA licences in respect of which the UK is not a launching state for the purposes of the Registration Convention.

Licence Conditions and Ongoing Monitoring

When granting a licence, Section 13(1) SIA permits the CAA to impose any conditions it sees fit on the licence. Such conditions may include, for example, an obligation to provide the CAA with regular updates on the environmental impact of the activities covered by the licence (see **5.1 Environmental Protection in Space**).

Section 26 SIA requires the CAA to carry out ongoing monitoring of space activities, and this is done by way of an "oversight and monitoring plan" imposed on the licensee. This fulfils the UK's duty to supervise the activities of its nationals pursuant to Article VI OST. One way

in which the CAA does this is by requiring all orbital operators to provide annual information on the conditions of their satellites as part of a “health check”.

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

The Office of Communications

The UK has been a member of the International Telecommunications Union (ITU) in one form or another since 1871. It is currently a member of the ITU Council for Region B (Western Europe), with its current term ending in 2026.

Ofcom is the UK’s regulator for broadcasting and telecommunications. It is also responsible for administering spectrum in the UK, as part of which it carries out three functions:

- granting licences to satellite earth stations located in the UK under the Wireless Telegraphy Act 2006 (WTA);
- managing satellite filings for UK-registered entities and notifying these to the ITU; and
- representing the UK internationally, including at the World Radiocommunication Conferences (WRC), which are held every three to four years.

Operators must apply to Ofcom to obtain an orbital position and associated spectrum satellite filing, which is then submitted to the ITU. Before notifying a filing to the ITU, Ofcom must first satisfy itself that the filing meets the requirements of the ITU Radio Regulations and Ofcom’s other conditions. Ofcom also deals with the transfer of satellite filings from one operator to another.

Other Regulators

Ofcom works closely with UK government bodies and regulators, including the CAA. Ofcom and CAA co-operate particularly on satellite filings, licences, and spectrum authorisation for launch operations. Ofcom also contributed to the National Space Strategy. Ofcom has also appointed the CAA as the band manager for several sets of radio spectrum frequencies.

When applying for licences under the OSA or the SIA, applicants are required to provide evidence to the CAA that they have access to a spectrum frequency and associated orbital position. To assist with this, applicants must complete a Radio Frequency/Spectrum Question Set (SRG2229), which requires the applicant to identify the satellite filing that the operator will be using, the orbital station to be used by the space object, and the ground stations that will be used on Earth. This information is then shared with Ofcom, and this allows the CAA and Ofcom to maintain a co-ordinated approach to the management of frequency and orbital slot allocations.

Harmful Interference

In accordance with Article 15 of the ITU’s Radio Regulations, Ofcom is responsible for investigating harmful interference in the UK and, where necessary, taking enforcement action to prevent it. This can include directing a satellite operator to cease transmission and, if the issue persists, prosecution leading to fines and prison sentences.

The Future

In November 2022, Ofcom published its updated strategy for managing the use of spectrum by the UK’s space industry. The strategy recognises the rapid growth of NewSpace in the UK as well as the increasing significance of earth

observation data for the purpose of tackling climate change, and sets out Ofcom's plans for ensuring that sufficient spectrum is made available to meet these needs. To achieve this aim, Ofcom committed to consulting on proposals covering, among other things, the authorisation of Earth gateways for new spectrum bands and the granting of stronger enforcement powers to Ofcom to prevent harmful interference.

2.6 Role of the State in the Launching Process

Regulation and Licensing of Launch

See 2.4 Role of the State in the Licensing Process for Space Activities.

Facilitation of Launch

See 2.3 Role of the State in Space Law and Regulations, 7.2 Finance Sources for Space Activities and 7.3 Attracting Investment for Space Activities.

Provision of Launch

The UKSA does not possess any launching capability and currently has no ambition to obtain this. As set out in the National Space Strategy and the Space Industrial Plan, the UK's preferred approach is to foster the growth of a satellite launch industry through private companies instead.

2.7 Commitment to International Treaties and Multilateral Discussions

The Space Treaties

See 1.1 The New Space and Space Tech Economy. The UK is a dualist jurisdiction, meaning that treaties and international law must be implemented in UK law to have effect domestically.

The UN Committee on the Peaceful Uses of Outer Space (COPUOS) and the UN Conference on Disarmament (CD)

The UK maintains a delegation to COPUOS and plays an active role in pushing forward the agenda in important directions, including in relation to space sustainability. For example, the UK provides funding through the UN Office for Outer Space Affairs (UNOOSA) for the promotion of the Guidelines for the Long-term Sustainability of Outer Space Activities (the "LTS Guidelines").

The UK is also an active member of the CD. However, in 2022 the UK Delegation to COPUOS informed the Committee of its view that COPUOS and the CD deal with separate issues and need to be kept separate as a result.

The International Telecommunication Union

See 2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots.

Bilateral Agreements and Partnerships

The UK has entered into the following bilateral agreements and partnerships with other space-faring nations:

- UK-USA Technology Safeguards Agreement – 17 June 2020;
- UK-Australia Space Bridge – 23 February 2021;
- UK-New Zealand Research, Science and Innovation Agreement – 1 July 2022;
- UK-ROK Space Cooperation Terms of Reference – 16 July 2022;
- UK-Japan Space Cooperation Terms of Reference – 17 March 2023;
- UK-EU Copernicus and Horizon Europe Participation Agreement – 7 September 2023; and
- UK-Canada Enhanced Memorandum of Understanding – 10 April 2024.

The UKSA maintains an International Bilateral Fund for the purpose of developing the UK space industry's relationships with strategic and emerging space nations. In 2023, the UKSA committed to spending GBP20 million on suitable projects and invited proposals for how the funds should be applied.

The UK's International Liability for Space Activities

Under Articles VI and VII OST, the UK is responsible for activities carried out by its nationals in outer space, and is internationally liable for any damage caused by a space object launched by or from the UK. The UK is also a signatory to the Liability Convention and qualifies as a "Launching State" in respect of any space objects launched by it or from its territory, as well as in respect of any launches procured by its nationals. Under Articles II and III Liability Convention, the UK is strictly liable for any damage caused by such space objects on land and in the air and will be liable on a fault basis for damage in outer space. This means that the UK is ultimately liable for any damage caused by satellites either launched from the UK or from locations overseas by UK nationals (legal and natural). Pursuant to Articles IX and XI OST, foreign states and persons (legal and natural) may pursue the UK for compensation in respect of damage suffered either through diplomatic means or in the UK's domestic courts (but not both).

As part of the licencing process, the CAA requires applicants for launch and orbital licences to provide an indemnity to the UK government in respect of any damage that might be caused by their space activities (see Section 10(1) OSA and Section 36(1) SIA). The required indemnity may be unlimited but, in practice, each licence will specify a limit of liability (caps on liability are permitted by Section 12(2) OSA and Section

36(3) SIA). As explained in **2.8 Insurance and State Measures on Liability for Damages**, applicants are required to hold third-party insurance to cover this potential liability (see Section 5(f) OSA and Section 38(1) SIA), and the terms of the insurance required are specified on each licence.

2.8 Insurance and State Measures on Liability for Damages

Current Requirements

The CAA is permitted by Section 5(2) OSA and Section 38(1) SIA to impose insurance requirements as a condition of a licence. The CAA's current practice is to impose the following indemnity and insurance requirements as conditions of licences for space activities:

- procuring a launch outside the UK (OSA): GBP60 million indemnity and matching third-party liability cover;
- procuring or carrying out a launch inside the UK (SIA): calculated using the Modelled Insurance Requirement (MIR) model;
- carrying out orbital operations from within the UK (SIA) or outside the UK (OSA):
 - (a) low-risk missions: insurance requirement may be waived, but GBP60 million indemnity remains;
 - (b) standard-risk missions: GBP60 million indemnity and matching third-party liability cover; and
 - (c) higher-risk missions: potentially >GBP60 million indemnity and matching third-party liability cover.

Third-party insurance held in respect of orbital operations may be held on an "any one occurrence" basis, as well as with an aggregate limit, if the CAA deems this to be appropriate. When determining the appropriate risk level for orbital operations, the CAA will consider whether the mission is novel in nature or scale, whether it

uses unproven technologies, and whether it presents a higher risk of third-party liability claims.

The MIR is used to calculate the minimum amount of third-party liability insurance required for a launch under either the OSA or the SIA. It is similar to the Maximum Probable Loss approach used in the USA: it involves an assessment of the insurance available in the market at the relevant time, a calculation of the probability of a launch failure occurring, and a calculation of the maximum possible third-party claims that might be made against an operator as a result. The results of the exercise are then recorded as the third-party insurance and indemnity requirement on the launch licence.

Future Requirements

Industry and government alike have recognised the development of the UK's insurance requirements as being vital for the growth of NewSpace in the UK and for the UK's launching capability in particular. Insurance was one of the key issues considered in the Liabilities Consultation and the SITC Report (see **2.2 Legal System and Sources of Space Law and Regulation**), and it also features heavily in the National Space Strategy and the Space Industrial Plan. Two areas for reform include the use of variable limits and the linking of space sustainability to reduced insurance and indemnity requirements. Whether any legislative changes will be made in this area remains to be seen pending the outcome of the Liabilities Consultation.

As noted in **1.1 The New Space and Space Tech Economy**, the Space Industry (Indemnities) Bill was recently shelved following the dissolution of Parliament. A short but important piece of legislation, the intention behind this bill was to increase certainty in the industry by requiring the

CAA to specify an indemnity limit in licences in all cases.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities Limitations on Space Activities

As explained in **2.4 Role of the State in the Licensing Process for Space Activities**, pursuant to Section 8 SIA, the CAA will only grant a licence to cover a space activity if doing so is not contrary to the national interest, if it is not inconsistent with the UK's international obligations, and if it does not compromise the UK's national security. The CAA does not typically impose time limits on licences but has a wide discretion to impose other conditions.

Cybersecurity

When applying for a licence, launch and return operators must provide the CAA with a safety case (see **2.4 Role of the State in the Licensing Process for Space Activities**). This must contain a cybersecurity plan, which must detail the cybersecurity risks faced by the applicant and the steps taken to mitigate those risks. The UKSA has published a Cyber Security Toolkit, which contains recommendations (ie, non-mandatory guidelines) designed to help operators manage their cybersecurity risks. The UKSA recommends that owners of space assets should look to achieve a Cyber Essentials Plus certification from the National Cyber Security Centre (NCSC). If the level of risk faced by the operator is categorised as either Level 4 (Significant) or Level 5 (Catastrophic), the UKSA recommends that the operator should be implementing ISO 27001 (a cybersecurity standard designed by the International Organization for Standardization).

Data Protection

The UK has implemented the General Data Protection Regulation through the Data Protection Act 2018 (the DPA). The UK's data protection regulator is the Information Commissioner's Office (ICO). The DPA applies to all data controllers and processors based in the UK, as well as any data processors or controllers based outside the UK provided that they offer goods or services or monitor the behaviour of individuals within the UK. This means that the DPA is very likely to apply to any entity carrying out space activities within the UK. Paragraph 25 of Schedule 1 to the SIA also provides that the CAA may impose conditions in a licence relating to the use, processing, communication, and distribution of data obtained during launch, return or orbital operations.

Breaches of personal data must be reported to the ICO. The Cyber Security Toolkit recommends that incidents should also be reported to the NCSC and UKSA, so that warnings and information can be shared among the space community.

3.2 Principles of Non-interference and Prevention of Harmful Interference

The UK is obliged by Article IX OST to consult with other nation states where it becomes aware that any space activity planned by one of its nationals may potentially cause harmful interference to the activities of another state.

Regulation 101 SIR provides that all operators must take reasonable steps to ensure that their space activities avoid interfering with other space activities. Regulation 101 also provides that operators must take reasonable steps to limit or prevent major accident hazards to the health, safety and property of other space objects, including by monitoring the trajectory

and orbital positioning of their space objects, avoiding the release of space debris and, if possible, by manoeuvring their space objects. The CAA recommends that operators comply with the IADC Space Debris Mitigation Guidelines issued by the Inter-Agency Space Debris Coordination Committee (IADC) when considering which "reasonable steps" are required by Regulation 101 SIR.

The UK also seeks to prevent harmful interference from occurring at the licensing stage. Regulation 29 SIR requires all applicants for space-flight licences to provide the CAA with a safety case, as part of which they must provide the CAA with the information contained in Schedule 1 and must demonstrate that their proposed activities will not interfere with the activities of others in the peaceful exploration and use of outer space. One way for applicants to do this is to adopt best practices for avoiding collisions and minimising debris, while also making specific design choices to avoid potential break-ups and collisions in orbit. The CAA will also make it a licence condition that the applicant must also carry out a Launch Collision Avoidance Analysis (LCOLA) before launch.

3.3 Operators' Responsibilities Operators' Obligations

See 2.4 Role of the State in the Licensing Process for Space Activities and 3.2 Principles of Non-interference and Prevention of Harmful Interference above for information on operator's safety and sustainability obligations and how these are monitored and enforced by the CAA.

Sustainability in Outer Space

The UK is committed to improving the sustainability of space activities themselves and is seeking to position itself as a global leader on the issue of debris removal. In 2022, the UK govern-

ment announced a Plan for Space Sustainability, in which it proposed to review the regulatory framework and establish a new Space Sustainability Standard to incentivise sustainable space practices. The results of the UK government's review are due to be published shortly and it remains to be seen whether these will be translated into legislation. Separately, King Charles III announced the Astra Carta in June 2023 as a new global framework for the establishment and promotion of sustainable space activities. The Astra Carta places great emphasis on developing technology to effectively carry out In-Orbit Servicing and Manufacturing (otherwise known as IOSM) as a way of boosting the sustainability of satellites and space objects.

In tandem with the Astra Carta, June 2023 also saw the launch of the Earth Space Sustainability Initiative (ESSI), which is funded by the UKSA. The motivation behind the ESSI is to bring together stakeholders from across the space industry to find ways of ensuring that the current generation's use does not jeopardise the potential economic and scientific use of outer space by future generations. To do this, the ESSI intends to first develop a set of "Space Sustainability Principles", which will eventually lead to a set of "Space Sustainability Standards" that can be used as a reference point by industry and government alike.

In terms of financial support for space sustainability, significant investment has also been provided by the UK government, through the UKSA, to NewSpace companies concerned with IOSM and the mitigation of space debris. Within Europe, the UK is a major investor in space debris clearance projects, including the ClearSpace-1 mission (the first mission to remove a derelict space object from orbit). In 2022, the UK government also announced that

it was increasing investment to boost awareness of and thereby support the implementation of UNOOSA's guidelines for the long-term sustainability of space (ie, Phase 3).

Intellectual Property and Outer Space

There is no agreed legal system for the enforcement of intellectual property rights in outer space. It is, however, possible for UK companies and individuals to register intellectual property rights (including copyright, patents, design rights and trade marks) in the UK relating to space technology. Such rights can be registered with the Intellectual Property Office and would be enforceable within the UK and, in the case of copyright in particular, in foreign countries pursuant to the Berne Convention.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

The UK does not currently have any legislation governing the ownership of space resources but has been a signatory to the Artemis Accords since 2020. As a signatory to that agreement, the UK has expressly recognised the potential benefits that may arise from the utilisation of space resources (Section 10(1) Artemis Accords) and has affirmed the view that the extraction of space resources does not constitute national appropriation of those resources for the purposes of Article II of the OST (Section 10(2) Artemis Accords). This suggests that the official view of the UK government is that UK citizens may lawfully exploit space resources, although the UK government has not so far provided a statutory basis allowing citizens to do so.

Nonetheless, the UK is home to several NewSpace companies whose ambition it is to under-

take in situ exploitation of outer space resources. Perhaps in response to this, the UK government has recently identified that certainty in respect of in situ resource utilisation on the Moon is critically important for encouraging UK industry to invest in the developing lunar economy. In the Space Regulatory Review published by DSIT in May 2024, DSIT has proposed that the UK government can help to achieve this certainty by setting out domestic and international policy covering norms and acceptable behaviours relating to in situ resource utilisation.

4.2 Granting of Rights to Space Resources

At present, the UK does not have any legislation governing the ownership of space resources either by the state or by private individuals or companies. Consequently, there is no granting authority for resource rights in outer space.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space Environmental Protection on Earth

The UK's legal framework contains environmental protection measures in relation to certain space activities (namely, launch and the operation of spaceports) on the Earth's surface. Pursuant to Section 11(2) SIA, all applicants for launch operator or spaceport operator licences under the SIA must complete an "assessment of environmental effects" (AEE) before they can receive a licence. The CAA's guidance for applicants about to undertake an AEE is set out in CAP 2215.

The AEE is intended to assist applicants for spaceport and launch licences, as well as the CAA, in identifying any environmental risks that

may arise as a result of their intended activities (for example, following the launch of a spacecraft or the launch of a spacecraft from a carrier launched from the spaceport in question). By way of example, these are likely to include risks to air quality, emissions targets, biodiversity, water quality, and noise pollution. If any such risks are identified during the AEE, then the applicant must take steps to mitigate the potential effects of those risks, following which the CAA may determine whether to grant a licence, and whether to impose conditions on that licence. To avoid duplication, Section 11(4) SIA permits entities that have already carried out equivalent assessments to submit these to the CAA instead of a fresh AEE. Spaceport licence holders are also required by Regulation 158 SIR to designate appropriate areas at the spaceport where hazardous materials must be stored. Any hazardous material storage facility must also be clearly marked.

Depending on the terms of the licence, licence holders may also be required to continue monitoring certain environmental effects and to report on these to the CAA after the licence is granted. In CAP 2215, the CAA has stated its intention to ensure that all licences will contain a so-called material change provision; this will require all spaceport and launch licence holders to provide a revised AEE upon the occurrence of a material change in environmental conditions at the location in question.

Spaceport and launch licence applicants should also check whether they will need to obtain planning permission and/or other forms of environmental licences, such as marine and wildlife licences. The SITC Report (see 2.2 Legal System and Sources of Space Law and Regulation) noted that many in the industry believed the need to make multiple applications to various

environmental agencies, often providing identical information, was a possible obstacle to the efficiency and attractiveness of the UK's licensing regime.

Environmental Protection in Outer Space

The UK's legal framework does not currently contain any measures for the protection of the environment either in space, on the lunar surface, or on the surface of any celestial body.

Dark and Quiet Skies

The increasing number of large satellite constellations poses a threat to the preservation of dark and quiet skies. The seriousness of this threat was expressly recognised by COPUOS at its 66th meeting in June 2023 and, in February 2024, during a meeting of the organisation's scientific and technical subcommittee, it was agreed that the topic of "Dark and quiet skies, astronomy and large constellations: addressing emerging issues and challenges" would be added to the COPUOS agenda for all meetings from 2025 to 2029.

The growing prominence of this issue is particularly relevant to the UK. First, the UK is home to companies like Eutelsat OneWeb that own and operate sizeable satellite constellations. Any steps agreed upon by COPUOS to tackle the issues posed by such constellations will be relevant to these companies. Second, this issue threatens astronomical activities carried out in and organised from the UK. Since 2021 onwards, the UK is the global headquarters of the Square Kilometer Array Observatory, which is an intergovernmental radio telescope project. The UK therefore has a direct interest in preserving dark and quiet skies.

5.2 Climate Change and Space Activities

The UK's legal framework does not currently contain any legislation governing climate change in relation to space activities.

The UK government does, however, recognise the important role that space may play in combating climate change on earth, particularly regarding Earth Observation (EO), and plays an active role in supporting the development of this area. As a member state of the ESA, the UK has been particularly active in Europe in supporting the TRUTHS climate and calibration satellite mission, which is designed to provide the most accurate climate data readings possible. Within the UK, the UKSA has invested substantial sums of money to assist NewSpace companies design and build new EO technology and, as part of the Space Industrial Plan, the UK government has identified this as a key growth area suitable for private investment. Most recently, the UKSA has provided funding of GBP15 million towards the manufacture of satellites and space-based instruments for the purpose of improving the collection of global climate data, and in the Space Industrial Plan the UK government also committed to opening a new EO data hub for the UK by no later than April 2025.

The UKSA is the chair of Space4Climate, a UK-based organisation that aims to bring together experts from industry, academia and the government to develop new space and satellite technology for the purpose of combating climate change. Space4Climate's focus is again primarily on EO.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

The UK has a modern and well-developed tax system which includes a range of tax incentives from which innovation-focused businesses, including those operating in the space sector, can benefit. These include reliefs for expenditure on qualifying research and development, a “patent box” regime under which a lower effective rate of corporation tax can be accessed for profits derived from exploitation of certain types of patents and IP rights, and a generous capital allowances regime, allowing up to 100% deductions against taxable profits for capital expenditure on qualifying plant and machinery. More generally, the UK offers a competitive tax regime for international investment, with no withholding taxes on dividends and a comprehensive range of double tax treaties and other exemptions, which in many cases allow withholding taxes on interest and royalties to be reduced or eliminated.

6.2 Tax Incentives for Space Investors

See 6.1 Tax System for Space Activities.

6.3 Taxation on Sale or Transfer of Space Assets

See 6.1 Tax System for Space Activities.

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

Development of NewSpace

As explained in 2.1 Characteristics of the Space Industry, NewSpace is a rapidly growing industry in the UK and its development has been recognised as a priority by the UK government.

Venture Capital

The UK has seen active investment from venture capital, with nine of the largest venture capital firms operating in the UK having invested in space since 2015. One of the world’s leading space venture capital funds, the Seraphim Space Group, is established in the UK and has raised over GBP250 million in investment to date. The Group’s first fund was launched in 2017, and its second fund (believed to be worth more than GBP70 million) was launched in April 2024. As well as venture capital, the Seraphim Space Group also operates its own accelerator for new space start-ups.

7.2 Finance Sources for Space Activities

Private Funding

With many venture capital funds now active in the NewSpace industry in the UK, there are significant sources of private finance for companies that are seeking investment and who are willing to give up equity in their business in return. As noted in 7.1 Impact of “NewSpace”, the world’s leading space venture capital fund, the Seraphim Space Group, has been active in the UK since 2017.

However, the UK government has identified that there is still a gap in the private funding available to companies in the UK NewSpace sector. It has stated that it is seeking to bridge that gap by helping potential investors to identify and gain access to investment opportunities within the industry. In particular, the UKSA has launched a programme called “Unlocking Space for Investment” that is dedicated to helping facilitate investment in Series A and B opportunities. The programme is open both to would-be investors (the “Investor Pathway⁸”) and to NewSpace sector businesses (the “Business Pathway”). Additionally, in the Space Industrial Plan, DSIT has proposed the creation of a new private invest-

ment framework for space, which would be used by the UK government to assess which areas of the NewSpace industry are suitable for and in need of investment, and to then help direct investment towards those areas.

Public Funding

Public funding remains an important source of finance for NewSpace in the UK. This was expressly recognised by the SITC Report, which identified that the provision of public funding is vital to the successful development of the UK's launch facilities. To date, the UKSA has provided over GBP30 million in funding to support the development of two of the largest of the UK's new spaceports: Spaceport Cornwall and Sutherland Spaceport.

Besides launch facilities, the UKSA also uses public funding to promote the successful development of "space clusters" in key strategic areas (see 2.1 **Characteristics of the Space Industry**).

The flagship source of public funding for the UK's space clusters is the UKSA's Space Clusters Infrastructure Fund (SCIF). In November 2023, the SCIF announced that it was providing GBP47 million in grants, which would be matched by private funding, to companies located at clusters across the UK. The UK government's commitment to the development of space clusters, and to providing them with public financing, was also re-confirmed in the Space Industrial Plan. In the Plan, the UK government stated its intention to prioritise support for the most focused clusters and to create a united nationwide network that would facilitate effective collaboration between the clusters.

7.3 Attracting Investment for Space Activities

As noted in 7.2 **Finance Sources for Space Activities**, the UK government has launched the "Unlocking Space for Investment" programme and is planning to implement a new private investment framework for the space industry. Both initiatives are designed to attract investment in space activities in the UK.

The UK is home to several catapult and accelerator programmes that are aimed at assisting NewSpace start-ups in establishing their businesses, and which may in turn provide attractive investment opportunities for investors. In the private sector, the Seraphim Space Group has established a successful accelerator that is focused specifically upon space technology start-ups located in the UK and which supports between 16–20 new businesses a year. In the public sector, the UK Space Agency Accelerator operates to help NewSpace start-ups at various stages of their journey and recently awarded GBP500,000 in funding to support new space enterprises.

More broadly, the UK government is intending to create an attractive environment for investment by ensuring that its regulatory regime is as streamlined as possible, while also providing certainty and clarity for would-be investors. This includes space sustainability, which the UK government intends to incentivise, and the ownership and exploitation of space resources. The UK government has recently concluded its review of the UK's regulatory landscape, as part of which it has considered how the regime created by the SIA 2018 can be fine-tuned, and is currently working on an implementation plan that will be designed to deliver improvements in this area.

7.4 Foreign Investment in Space Activities

In the UK, certain types of transaction relating to certain strategic sectors are governed by the National Security and Investment Act 2021 (NSIA 2021). The transactions covered by the NSIA include larger scale transactions like mergers and acquisitions, but also smaller scale transactions including minority investments, the acquisition of voting rights and operational control over companies, as well as the acquisition of certain types of assets. The sectors covered by the NSIA 2021 are identified by the accompanying National Security and Investment Act 2021 (Notifiable Acquisition) (Specification of Qualifying Entities) Regulations 2021 (NSIR 2021).

Schedule 14 NSIR 2021 identifies satellite and space technology, which it defines very broadly, as one of the key sectors falling within the scope of the NSIA 2021. This means that investments in companies involved in the space industry in the UK may need to be notified to the Investment Security Unit (ISU), which is an operational unit within the Cabinet Office. If the investment will result in the acquisition of more than 25%, 50% or 75% of the voting rights or shares in the target entity, or will result in the acquiring entity becoming able to pass or block any class of resolution, then a mandatory notification to the ISU will be required. If the transaction involves a smaller percentage or shares but may still result in the acquiring entity gaining “material influence” over the target, then the company may make a voluntary notification. The same applies if the transaction relates to the acquisition of control or direction over an asset. In the case of a voluntary notification, the ISU may determine whether it is necessary to call in the transaction for a more detailed national security assessment.

For the NSIA 2021 regime to apply, there must be a factor that connects the transaction to the UK. This means that either the target asset or the entity must be sufficiently closely connected to the UK. This in turn requires that the entity must carry on activities within the UK or supply goods or services to people in the UK; similarly, a target asset must be used in connection with any such activities carried out in the UK. In practical terms, all NewSpace companies established and active in the UK will fall within the geographical scope of the NSIA 2021 regime.

7.5 Role of Securities Markets in Space Financing

The UK securities markets play an important role in financing activities in the growing NewSpace sector.

As with participants in other sectors, NewSpace companies can utilise the UK's established securities markets to raise significant and necessary capital from new institutional and retail investors to fund research and development, manufacturing, and operational expansion.

In the UK, the two largest equity markets are the Main Market of the London Stock Exchange and the Alternative Investment Market (AIM). Each market serves different types of companies and has a distinct regulatory environment. The Main Market is suited to larger, more established companies, generally with significant revenues and more demonstrated financial histories. Entities wishing to list on the Main Market are subject to more stringent regulatory and governance requirements. There is a diverse investor base comprising various large institutional investors and funds. In comparison, AIM is designed for smaller, high-growth companies, often in emerging markets such as NewSpace. Its regulatory regime is tailored for smaller companies. Whilst

retaining an institutional investor base, AIM often attracts venture capital and other high net worth individual investors.

Both the LSE and AIM provide opportunities for NewSpace companies to go public through an IPO and, once listed, access additional capital through secondary offerings to new and existing investors. This ongoing access to capital is crucial for NewSpace companies that require substantial investment for development and scaling. An example of this is the GBP178.4 million IPO of Seraphim Space Investment Trust plc on the Main Market of the LSE in 2021.

Trends and Developments

Contributed by:

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Preiskel & Co LLP is a City law firm specialising in the telecommunications, media and technology sectors. With a team of 35, the firm and its leading partners have been internationally acclaimed and ranked in Chambers for approximately 20 years for regulatory, commercial and corporate expertise throughout the telecoms sector. The firm's specialist telecoms lawyers have considerable telecoms industry experience extending across all the continents and into outer space. They have been at the fore-

front of telecoms liberalisation across the globe. The team of multilingual telecoms and tech lawyers possess insights from having worked within the industry for incumbent operators, MVNOs and start-ups, as well as in telecoms-related investment banking. This deep industry and legal understanding enables clients to benefit from cost-effective, strategic first-class advice. Preiskel & Co's clients include governments, regulators, all manner of mobile, satellite and fixed communications providers and broadcasters.

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Daniel Preiskel co-founded Preiskel & Co over 20 years ago and has over 30 years' TMT experience advising across the globe. Chambers UK has ranked him as a leading

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Introduction

Whilst space is vast and boundless, it is not devoid of regulations and laws. In the UK, space law encompasses a variety of statutes, regulations, and adherence to international treaties designed to ensure that activities conducted in outer space are safe, sustainable, and beneficial to humanity. This article delves into the intricate legal framework governing space-related activities regulated by the UK.

Early Developments and International Treaties

The inception of space law in the UK can be traced back to the early 1960s, coinciding with the dawn of the space age. The UK, being a member of the UN, played a significant role in the formulation and adoption of pivotal international treaties that laid the foundation for space law. These UN treaties include:

- The Outer Space Treaty (1967): The cornerstone of international space law, this treaty establishes that outer space shall be free for exploration and use by all nations, and prohibits the placement of nuclear weapons in space. Remarkably, given the advances in technology since 1967, this Outer Space Treaty of 1967 still remains the cornerstone of international space law.

- The Rescue Agreement (1968): This treaty outlines the responsibilities of states to assist astronauts in distress and ensure their safe return.
- The Liability Convention (1972): It establishes liability rules for damage caused by space objects.
- The Registration Convention (1976): It requires states to register space objects launched into orbit with the UN.
- The Moon Agreement (1984): Although not as widely ratified, it further extends the principles of the Outer Space Treaty to the Moon. It forbids the establishment of military bases, installations and fortifications on the Moon, as well as the testing of any type of weapons and the conduct of military manoeuvres on the Moon. However, the use of military personnel for scientific research or for any other peaceful purposes is not prohibited.

UK national legislation

The UK has ratified these key treaties, integrating their principles into domestic law and ensuring that its space activities are aligned with international standards. The UK's legislative journey in space law formally began with the Outer Space Act 1986.

Currently, the Outer Space Act 1986 governs space activities carried out by UK entities overseas, while the more recent Space Industry Act 2018 and its associated regulations govern space activities carried out from within the UK.

The Outer Space Act 1986

The Outer Space Act 1986 reflects the UK's commitment to the international Outer Space Treaty 1967. The Outer Space Act establishes the requirement for a licence to launch or operate a space object, or to perform any activity in outer space. It also includes common sense obligations to ensure that space activities are carried out in a safe and environmentally responsible manner. To enshrine these principles, anyone performing these activities is required to indemnify the UK government against any claims for loss or damage from their activities.

The Space Industry Act 2018 and associated regulations

The Space Industry Act 2018 allows commercial satellite launches on UK soil and sets out the regulatory framework for UK-based space activities. Its intention is to help create certainty and safety in commercial space activities, and to enable the sustainable growth of the UK space industry. Like the Outer Space Act, it sets out the requirements for space activity and spaceport licencing, and the obligation to indemnify the UK government. Regulations and guidance have since been published with additional details surrounding licencing requirements and regulatory activities, which are administrated by the Civil Aviation Authority.

National Space Strategy

The UK government published a National Space Strategy in 2021, estimating the UK Space Industry to be worth GBP17.5 billion per year and to employ over 48,000 people. The National

Space Strategy outlined five key goals: growth of the space economy, promotion of the values of a "Global Britain", leading scientific discovery, defence, and use of space to deliver services.

Similarly, each of the devolved nations has published their own space strategies: Scottish Space Strategy (2021), Northern Ireland Space Strategy (2021), and Wales: A Sustainable Space Nation (2022). Each of these focuses on the economic opportunities presented by investing in the space industry. Space is a reserved matter, so it is governed by Westminster for all four nations, but related matters such as planning and environmental policy are devolved to the national legislatures.

Key Aspects and Themes in UK Space Law *Regulatory bodies*

Several key regulatory bodies play crucial roles in the implementation and enforcement of space law in the UK:

- **UK Space Agency:** The primary regulatory authority responsible for issuing licenses, monitoring compliance, and promoting the growth of the UK space industry.
- **Civil Aviation Authority (CAA):** Involved in the regulation of spaceports and the integration of space activities with aviation safety.
- **Health and Safety Executive (HSE):** Ensures that space activities comply with health and safety regulations.
- **Ofcom:** Regulates the use of radio frequencies for space communication.

These bodies work collaboratively to ensure that space activities in the UK are conducted in a safe, secure, and sustainable manner.

Growth and investment

A key goal of the National Space Strategy is the growth of the UK's space economy. The UK aims to become Europe's leading provider of small commercial space launches by 2030. The UK recognises the importance of both public and private sector investment availability to achieve this goal, due to the high capital requirements of space projects.

One key initiative has been the creation of the Seraphim Space Investment Trust, a space-oriented venture capital fund supported by the government-owned British Business Bank. Multiple open funding opportunities are currently available from the UK Space Agency, including for proposals related to active debris removal, satellite communication development, and innovation in positioning, navigation and timing (PNT) technologies. Further, in July 2023, the Space Exploration Technology Roadmap was published by the UK Space Agency, identifying areas of existing technological strength as well as areas for innovation for future space exploration missions.

Space debris

In 2022, the UK Space Agency awarded GBP4 million in funding to a mission to clear hazardous space junk. The mission intends to launch in 2026. Space debris and orbital congestion are challenges facing the international space community, with over 130 million pieces of space debris in Earth's orbit. Space junk can remain in orbit for hundreds of years, potentially interfering with satellites or other space vehicles. It is difficult and costly to reroute active space objects to avoid debris which may be in their path. Additionally, the sustainability of space is improved by the longevity of satellite hardware, so damage from debris needs to be kept to a minimum. The UK Space Agency has overall

committed GBP102 million in funding to tackle the issue. Other space sustainability measures include steps towards improved manufacturing of satellites for better longevity, and the ability to service and recycle satellites while still in-orbit.

Additionally, UK guidance on space operations is written to comply with the UN's guide for the Long-term Sustainability of Outer Space Activities, reflecting the UK's commitment to maintaining outer space as a peaceful, safe, stable, and sustainable environment.

Liability and indemnity

Since space operations are high risk by nature, minimum limits of liability, indemnity, and insurance requirements are a continual discussion in this arena. Insurance requirements for space launches are under continual review to ensure they are proportionate to the risks and adequately cover the diversity of space operations. All licences issued under the Outer Space Act must include a minimum indemnification obligation and insurance cover. Orbital operations currently require a EUR60 million insurance requirement and indemnity for standard missions. Ministers have announced that licences under the Space Industry Act will include similar indemnification obligations. Additionally, Space Industry Act licences will include minimum insurance cover levels as regards the operator's liabilities to third parties in most circumstances. While allowing for the limitation of an operator's liabilities, the Space Industry Act enforces strict liability for the operator in case of loss or damage derived from their activities. This means that liability can be incurred by the operator without a requirement to prove fault, which differs from the international approach.

International space law on negligence dictates that, in case of damage caused in space by one

space object to another, the liability is attributed to the launching state on a fault basis. This liability can then be passed on to the operator under the indemnity in the licence. If a case like this were to go to court, then to establish fault, one would demonstrate a lack of compliance with treaty obligations, a breach of an established duty of care, or a failure to adhere to industry standards. The new and changing nature of the space industry creates a problem in this regard, as international codes of practice often lag behind technical innovation. Industry best practices are being developed but are often fragmented at a more national level (the proposed European Space Law may help harmonise in this regard).

Current legal frameworks struggle to adequately account for the complexity of interests in space, with key players representing both commercial and state interests, national and international efforts, and a wide variety of purposes. Further, the competitive and close-knit nature of the space industry means that, in the event of litigation, it would be difficult to find independent, reasonable third parties to weigh in on industry standards. Any experts might in fact be direct competitors, so impartiality may prove difficult. Navigation of disputes and liabilities will be fraught, with the likelihood of collisions increasing as space debris continues to accumulate.

Licensing process

The National Space Strategy includes the UK's commitment to keeping licence processes low-cost and efficient. The current fee for a single orbital application under either the Space Industry Act or the Outer Space Act is GBP6,500, which is waived for educational institutions carrying out scientific research. However, following the unsuccessful Virgin Orbit horizontal launch from Spaceport Cornwall in January 2023, lead-

ing to the loss of a payload of small satellites, Virgin Orbit and some of its satellite customers criticised the UK regulatory process. The regulatory and licensing procedures were described as slow, excessively bureaucratic, and unnecessarily risk averse. The subsequent inquiry found that, while the regulatory system did not contribute to the launch failure, there were significant improvements needed. A list of recommendations was published, most of which have been adopted or are currently being implemented. This includes a number of improvement projects to simplify the licensing process and increase visibility to the applicant.

Defence

Amidst growing geopolitical tensions, with concerns about Russia, China, Iran, and North Korea's development of counter-space technologies, the role of space in defence is growing in importance. Space operations represent both a vulnerability to be protected, as well as a key tool in bolstering the UK's defence capabilities.

The vulnerability derives from the UK's reliance on satellite information in the delivery of public services as well as the operation of its economy. It is estimated that over GBP360 billion of the UK's economic activity is supported by space technology. Losses or interruptions to satellite data availability can result from any number of causes, from severe space weather to cybersecurity threats. In response, the UK has published the Position, Navigation and Timing Resilience Framework, to improve resilience in this area. The Framework includes the establishment of a National Position, Navigation, and Timing Office, with responsibility for a PNT Crisis Plan which can be activated in case of losses or interruptions.

To expand the UK's defence capabilities, the UK launched a Defence Space Portfolio as part of the National Space Strategy. This represents an investment of GBP5 billion over ten years in the military's satellite communications (the Skynet Constellation) and an additional GBP1.4 billion in new technologies and capabilities. These new capabilities will range from space domain awareness, intelligence advancements, surveillance and reconnaissance, and command and control capabilities. Additionally, the UK continues to be a NATO member, with the organisation adopting its own Space Policy in 2019, acknowledging the need for a unified space defence strategy.

It is clear this focus on defence is a reaction to the growth of both space and counter-space research in a variety of countries, with China being a concern to the UK. A recent report by the UK Parliament's Intelligence and Security Committee reflected views of Chinese intelligence as a national security threat. While China is a signatory of the UN Outer Space Treaty, and thereby obligated to support the peaceful exploration of space as the province of all mankind, some have voiced concerns regarding China's space programme. Some authorities doubt that China will abide by the terms of the Treaty. As the space industry becomes a more competitive sector, and further research is carried out on the potential commercial applications of lunar minerals (a lunar surface mineral Changsite-(Y) has been identified as a potential energy source), commercial competition could enhance geopolitical tensions.

The UK's role in space multilateralism

As set out by the UK's National Space Strategy, the UK is committed to international collaboration as a key method to achieve its space goals. A multilateral approach to space operations is critical to maintaining peace and equal access

to potential scientific and commercial opportunities. In recognition of this, the UK continues to collaborate on a wide range of international projects. Even post-Brexit, the UK continues to be a member of the European Space Agency, working on the Lunar Pathfinder currently being built in Surrey. The UK regularly collaborates with US organisations, including as a party to the Artemis Accords (October 2020) representing a shared international vision for human activity on Mars and the Moon, as well as operating under legal frameworks developed by Operation Olympic Defender for information and resource sharing. The UK entered into the UK-Australian Space Bridge agreement in 2021, to improve trade, investment, and academic research opportunities between the two countries.

European Space Law and Its Potential Effect in the UK

The EU has been increasingly targeting space as a legislative frontier, launching the EU Space Programme in 2021 and the EU Space Strategy for Security and Defence in 2022. EU Commission President Ursula von der Leyen identified an EU space law as a priority for 2024. The European Space Law is expected later this year (2024) and will seek to standardise Europe's currently fragmented approach to space legislation. It will likely address key issues such as satellite traffic, space debris in orbit around Earth, protection of satellite infrastructure, and establish a single market for space to increase competition. As the UK continues to be a member of the European Space Agency, the European Space Law will have an effect. UK organisations looking to collaborate with, or sell to, EU spaceflight or satellite providers will need to be aware of this legislation, as it will apply to non-EU companies conducting business within the bloc. Of the GBP17.5 billion comprising the UK's space industry, GBP5.9 billion is income from exports,

so adherence to international regulations is key for the continued growth of the UK's space economy.

Future direction and conclusion

The UK space law framework is expected to evolve further in response to emerging trends and challenges. Key areas of focus for future development include:

- space traffic management: developing regulations and protocols for managing the increasing congestion in outer space;
- commercial space activities: adapting the regulatory framework to accommodate new commercial ventures such as space tourism and asteroid mining; and
- sustainability: enhancing measures to promote the long-term sustainability of space activities, including the mitigation of space debris.

From its early engagement with the UN Treaties to the modern legislative framework embodied by the Space Industry Act 2018, the UK has established itself as a leading jurisdiction in space law. As the space industry continues to evolve, the UK's regulatory framework will undoubtedly adapt, ensuring that it remains at the forefront of global space governance.



Law and Practice

Contributed by:

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Holland & Knight LLP

Contents

1. Global Trends p.252

1.1 The "NewSpace" and Space Tech Economy p.252

2. Existing Legal and Regulatory Framework p.252

2.1 Characteristics of the Space Industry p.252

2.2 Legal System and Sources of Space Law and Regulation p.253

2.3 Role of the State in Space Law and Regulations p.254

2.4 Role of the State in the Licensing Process for Space Activities p.255

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots p.256

2.6 Role of the State in the Launching Process p.257

2.7 Commitment to International Treaties and Multilateral Discussions p.257

2.8 Insurance and State Measures on Liability for Damages p.258

3. Rules Applicable to Space Operators' Activities p.259

3.1 General Rules on Space Activities p.259

3.2 Principles of Non-interference and Prevention of Harmful Interference p.260

3.3 Operators' Responsibilities p.260

4. Ownership of Extraterrestrial Resources p.262

4.1 Nature of Space Resource Rights p.262

4.2 Granting of Rights to Space Resources p.263

5. Environmental Protection and Impact on Climate Change p.263

5.1 Environmental Protection in Space p.263

5.2 Climate Change and Space Activities p.264

6. Taxation of Space Activities p.264

6.1 Tax System for Space Activities p.264

6.2 Tax Incentives for Space Investors p.265

6.3 Taxation on Sale or Transfer of Space Assets p.265

7. Investment and Financing in Space Activities p.265

7.1 Impact of "NewSpace" p.265

7.2 Finance Sources for Space Activities p.266

7.3 Attracting Investment for Space Activities p.267

7.4 Foreign Investment in Space Activities p.267

7.5 Role of Securities Markets in Space Financing p.268

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Holland & Knight LLP provides a full suite of legal, regulatory and legislative services to entrepreneurs, start-up companies and global industry players. The firm's satellite and space technology team couples its decades of industry-focused experience with its full-service and cross-border capabilities to advise on virtually every significant area within the satellite and space technology industry. The team includes approximately 20 attorneys located in Washington, DC, the Florida Space Coast, Colorado, Texas, California and other key markets, and features several team members who have held high-level US government positions that are rel-

evant to the industry. The firm has particularly deep experience in structuring space-related transactions, navigating the patchwork of complex and multi-agency regulations impacting the space industry, and advising early-stage and growth-stage technology companies on corporate formation and structuring, as well as in counselling other market participants in regulatory and legislative matters, corporate transactions, national security and export controls matters, investigations and litigation. Anna Vizniak, an international law clerk, was an additional key contributor to this submission.

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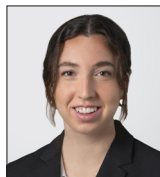
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1. Global Trends

1.1 The “NewSpace” and Space Tech Economy

The United States is a party to the Outer Space Treaty, the Liability Convention, the Registration Convention, and the Rescue Agreement. The United States is not a signatory or party to the Moon Agreement. The USA is bound by and implements the fundamental principles of the aforementioned treaties to which it is a signatory through its space regulatory framework, policies, and space missions. These principles include the exploration and peaceful use of outer space, prohibition of weapons of mass destruction in outer space, co-operation, and responsible behaviour in space activities.

Together with other space agencies, the National Aeronautics and Space Administration (NASA) participates in the International Space Exploration Coordination Group and works closely with other countries on the International Space Station (ISS) Program. The importance of compliance with international treaties is also reflected in the Artemis Accords, a set of common principles, guidelines, and best practices that apply to the safe exploration of the Moon, signed by more than 40 countries participating in the NASA-led Artemis programme.

Upcoming US federal legislation is expected to address space traffic management, including the increasing volume of satellites, spacecraft, and debris in orbit, to prevent collisions and ensure the sustainability of space activities. In this regard, the Office of Space Commerce (OSC) within the Department of Commerce (DOC) manages the Traffic Coordination System for Space to provide basic space situational awareness data to civil and commercial space operators. Additionally, in 2023, the Senate passed

the Orbital Sustainability Act, which aimed to decrease orbital debris and require the development of uniform orbital debris practices. If it passes the House and is signed into law, NASA, the National Space Council, and the Department of Commerce will carry out debris-related R&D, develop debris mitigation best practices, and facilitate space traffic management.

In November 2023, the Commercial Space Act of 2023 was introduced in the House. This bill would update, modernise, and streamline regulatory processes for commercial space activity. One key change is the designation of the OSC as the single authority responsible for space operator certification. In December 2023, the White House put forward a competing legislative proposal, as well as a Novel Space Activities Authorization and Supervision Framework, which would grant the Department of Transportation (DOT) and the DOC further authorities to oversee novel space activities depending on whether the space activities involve humans or not.

The United States continues to focus on space as a contested domain. The 2023 report by the Select Committee on the Strategic Competition Between the USA and the Chinese Communist Party emphasised the importance of countering Chinese space ambitions by prioritising US funding for space command and control, promoting US leadership in multilateral space governance, and fostering American innovation.

2. Existing Legal and Regulatory Framework

2.1 Characteristics of the Space Industry

The United States has the most advanced and diverse space industry in the world. In 2023,

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the US government invested billions in space capabilities both directly and as a commercial customer.

The US space industry is characterised by both private and governmental market participants in both civil and defence sectors. While for decades NASA and the Department of Defense have played crucial roles in space research and development, both agencies now benefit from growing commercialisation within the space industry. Several well-established private players, in addition to new participants, have taken the lead in developing capabilities for crewed and uncrewed launch, orbital manufacturing, mining, and sensing.

The NewSpace economy is characterised by decreasing launch costs, increasing popularity and capability of small satellites, commercial applications of AI and robotics in outer space, reusable rockets, use of 3D printing in space, and more. In 2023, there were more US launches and satellites in orbit than ever before.

In 2017, NASA established the Artemis programme with the goal of sending astronauts back to the lunar surface and developing an ongoing presence there. The knowledge obtained from this programme is expected to assist in preparing for human exploration of Mars. NASA depends on domestic and international commercial partners for various stages of the Artemis programme.

The US commercial satellite market is rapidly growing, driven by advancements in communications and sensing technologies, improvements in materials and computing, and decreasing launch costs. Key players include established aerospace companies and innovative start-ups. Communication satellites support global inter-

net, broadcasting, and secure communications, while sensing satellites offer critical data for weather, agriculture, and security. In 2023, the commercial satellite industry launched a record number of satellites into orbit and reached billions of dollars in revenue, with projections indicating continued growth.

2.2 Legal System and Sources of Space Law and Regulation

US space law includes a combination of civil and common law features. The main sources of US space law include international treaties, executive orders, case law and the following federal statutes and regulations:

- The National Aeronautics and Space Act establishes NASA and defines its main functions.
- The Commercial Space Launch Act, as amended, authorises the Federal Aviation Authority (FAA) to license launch and re-entry activities. The Act also imposes insurance and financial responsibility requirements on licensees and encourages commercial space launch and re-entry by the private sector. It creates a mutual indemnification and risk-sharing regime, requires informed consent by spaceflight participants, and provides a learning period before the FAA can prospectively regulate for the safety of parties involved in a launch. It also provides a property rights framework for resources obtained from celestial bodies.
- The Communications Act authorises the Federal Communications Commission (FCC) to oversee and regulate radio communication activities by, and allocation of spectrum between, non-federal governmental and commercial entities.
- The Land Remote Sensing Policy Act authorises the Secretary of Commerce to license

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- private sector parties to operate private remote sensing space systems.
- The Weather Research and Forecasting Innovation Act authorises commercial weather satellites and allows NOAA to purchase weather data from commercial weather satellite constellations.

The US space regime is also shaped by a large number of policies and guidance documents, such as the National Space Policy, the United States Space Priorities Framework, Space Policy Directives 1-7, classified Space Security Guidance, and the NASA Strategic Plan.

In terms of case law, key cases and administrative proceedings include disputes over satellite licensing requirements, liability for space debris, and intellectual property rights in space technology. In 2023, the FCC for the first time took an enforcement action for violation of its orbital debris mitigation rules (see **3.3 Operators' Responsibilities**).

2.3 Role of the State in Space Law and Regulations

The United States has a diverse system of federal agencies and departments responsible for the development of space policy and regulation of both civil and defence-related space activities. The government actively co-operates with businesses and, in addition to its regulatory functions, often acts as a participant or facilitator for different space missions, often through NASA or DOD.

Civil and Commercial Space Activities

In addition to NASA's responsibility for civil space exploration, aeronautics, and space research, there are several additional authorities that play crucial roles in the US space sector:

- The FAA, within the DOT, issues commercial launch and re-entry licences, verifies that launch and re-entry vehicles operate as intended, and ensures flight crew qualifications and training.
- The FCC regulates radio communications, allocates spectrum and supervises its use, issues licences for Earth and space stations, and is beginning to address issues concerning orbital debris.
- Within the DOC, NOAA collects environmental information through satellites and regulates Earth observation capabilities on commercial satellites, while the OSC promotes economic activity in space. Additionally, the Bureau of Industry and Security (BIS) regulates export, re-export, and transfer of most commercial space items. The National Telecommunications and Information Administration (NTIA) is responsible for administering the radio spectrum for federal use.
- The United States Department of Energy develops, manufactures, tests, analyses, and delivers radioisotope power systems and other energy appliances and electronics for space exploration.

Defence Space Activities

The DOD is responsible for ensuring US national security as it relates to space programmes, military and intelligence missions, and space defence strategy. The DOD enforces its policies and operations through the following agencies and governmental branches:

- The United States Space Force, a newly established branch of the armed forces, organises, trains and equips personnel for defence space operations, manages space launch operations, and provides services for space launches.

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- The United States Space Command employs joint forces from the United States Army, Marine Corps, Navy, Air Force and Space Force, and co-ordinates space surveillance and missile defence.
- The Space Development Agency designs and develops novel space technologies, including threat-driven constellations of small satellites, to enhance military capabilities.
- The Army Space and Missile Defense Command develops and provides global space, missile defence, and high-altitude capabilities to the US military.
- The National Geospatial-Intelligence Agency (NGA) analyses satellite images and geospatial data to produce intelligence for military operations, disaster relief, and environmental monitoring.
- The National Reconnaissance Office operates reconnaissance satellites to gather intelligence on foreign military capabilities.

2.4 Role of the State in the Licensing Process for Space Activities

In the United States, space activities are overseen primarily by the FAA through the Office of Commercial Space Transportation. The FAA is responsible for issuing the following licences, permits, and approvals for commercial space launches and re-entries, as mandated by the Commercial Space Launch Act:

Vehicle Operator Licence

This licence authorises a licensee to conduct one or more launches or re-entries using the same vehicle or family of vehicles (14 CFR 450.3).

To receive a licence, an applicant must obtain a policy approval (confirmation that launch/re-entry would not jeopardise US national security, foreign policy interests, or international obligations), favourable payload determination, safe-

ty approval, satisfy the environmental review requirements, and receive a maximum probable loss analysis (14 CFR 450.31).

The vehicle operator is also required to obtain liability insurance or demonstrate financial responsibility (see **2.8 Insurance and State Measures on Liability for Damages**). For crewed missions, an operator must train each member of its crew and define standards for successful completion of the mission (14 CFR 460.7). While the FAA has plenary authority to regulate for the safety of uninvolved parties, Congress has limited its authority to issue prospective regulations related to safety of humans on commercial space flights.

Spaceport Licence

There are two types of licences: (i) licence to operate a launch site (14 CFR 420); and (ii) licence to operate a re-entry site (14 CFR 433).

To receive a licence, an applicant must provide information on the launch site, launch site operator, foreign ownership, comply with environmental requirements, conclude the agreements with the United States Coast Guard and FAA Air Traffic Control, obtain a policy approval, develop explosive site plan, and more (14 CFR 420.17).

Both vehicle operator and spaceport licences are valid for up to five years from the issuance date and must be obtained by US citizens seeking to engage in the activity, anywhere in the world.

Experimental Permit

This permit is issued for the following purposes:

- research and development to test new design concepts, equipment, or operating techniques;

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- a showing of compliance with requirements for obtaining a licence as mentioned above; and
- crew training before obtaining launch/re-entry licence (14 CFR 437.5).

It authorises an unlimited number of launches or re-entries of a reusable suborbital rocket for a period of one year (14 CFR 437.9 and 437.11).

An applicant must provide a programme description, a flight test plan, and operational safety documentation (14 CFR 437.21).

To comply with US obligations under the Registration Convention, each licensee is required to submit information to the FAA concerning all objects placed in space by a licensed launch (14 CFR 450.271).

The FAA consults with the DOD, the State Department, and other federal agencies, including NASA, when issuing licences and permits. A special permit from NOAA's Commercial Remote Sensing Regulatory Affairs Office is required if a satellite is equipped with remote sensing capabilities. Additionally, the FCC plays a crucial role in the regulation of space activities through allocation of radio spectrum and licensing of Earth and space stations (see **2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots**).

2.5 Role of the State in Co-ordinating the Use of Radio Frequencies and Orbital Slots

In the United States, the radio spectrum is administered by the NTIA and the FCC, which are responsible for federal and non-federal use, respectively.

Spectrum allocations by both authorities are reflected in the United States Table of Frequency Allocations (the "Table"), which is amended regularly to meet evolving spectrum needs. The Table is divided based on frequency bands, type of radio services, including primary and secondary classification, exclusive/shared federal and non-federal use.

Licence applicants and licensees subject to renewal must comply with frequency tolerance requirements, emission limits, power limits, transmission standards and spectrum sharing requirements. Satellite operators must comply with "equivalent power flux density" (total power directed by satellites), and limits established by the International Telecommunication Union (ITU). The Spectrum Enforcement Division within the FCC is responsible for consideration of interference complaints and other spectrum-related issues.

Similarly to other market participants, space operators are generally required to obtain space station and Earth station (if applicable) licences which also authorise the use of particular spectrum. To facilitate growth of the commercial space industry, in 2023, the FCC:

- streamlined the licence application process for new satellites and satellite Earth stations;
- authorised ground-to-launch vehicle telecommand communications in the 2025-2110 MHz band and telemetry uses of the 2200-2290 MHz band in support of commercial space launches; and
- sought comment on potential new frequency allocations for communications with cargo and crew capsules and payload communications with the space stations.

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Due to the increasing number of satellite licence applications (mostly low Earth orbit, or LEO), the FCC established the Space Bureau and the Office of International Affairs for processing applications, addressing orbital debris, and contributing to the NewSpace international regulatory regime.

2.6 Role of the State in the Launching Process

Space launches in the United States include both state and commercial components. Depending on the mission, the USA acts as a provider, facilitator, regulator, and/or user of space assets. The DOD, NASA and other agencies have issued various strategies on integration of commercial space solutions and co-operation with the private sector.

There are several FAA-licensed spaceports in Alabama, Alaska, California, Colorado, Florida, Georgia, New Mexico, Oklahoma, Texas, and Virginia with varying capabilities to support vertical and horizontal rocket launches and re-entries. The USA leases federally-owned launch pads, often through a bidding process, to commercial launch companies. The lease contracts are normally concluded for several years on an exclusive or non-exclusive basis, and generally allow launch companies to make improvements to the launch pads. In addition, the USA provides and facilitates the provision of test facilities, integration facilities, transportation services, hangars, launch control systems, plumbing for rocket liquids, and more, to commercial launch companies. NASA astronauts have routinely participated in missions aboard commercial space vehicles, beginning in 2020.

The USA also acts as a major customer for the commercial space industry. NASA, the DOD, and other civilian and intelligence agencies procure

launches, payloads, and a wide variety of services using commercial contracts. Among the highest-profile commercial contracts are NASA's Commercial Crew and Commercial Resupply Programs, in which commercial launchers ferry NASA astronauts and cargo to and from the ISS, and the Space Force's National Security Space Launch Program, which provides critical launch services for DOD and Intelligence Community missions. Currently, NASA has more than 1,300 active Space Act Agreements, a special type of agreement under the National Aeronautics and Space Act authorising NASA to engage with commercial industry. Finally, many commercial space companies are participating in key aspects of the Artemis programme.

2.7 Commitment to International Treaties and Multilateral Discussions

The United States is a party to the principal UN space treaties, except for the Moon Agreement (see 1.1 **The New Space and Space Tech Economy**). The USA is also a member of the UN Committee on the Peaceful Uses of Outer Space and UN Conference on Disarmament, where it works to advance US national security through multilateral diplomacy.

The United States supports (and complies with) the formulation in the Outer Space Treaty that outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all states. The Competitiveness Act provides that US citizens are entitled to property rights, including the right to possess, own, transport, use, and sell, asteroid and space resources obtained by them (see 4.1 **Nature of Space Resource Rights**).

The United States has in place several laws and regulations designed to carry out its responsibilities under the Outer Space Treaty. These include

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rules governing the calculation of maximum probable loss caused by licensee activities, binding financial and insurance obligations (see **2.8 Insurance and State Measures on Liability for Damages**), and space traffic management and debris mitigation and removal requirements.

Although not directly defined, the principle of due regard is implemented by the USA in various ways, including through NASA policies and programmes, FCC debris removal requirements, FAA licensing requirements, and more.

2.8 Insurance and State Measures on Liability for Damages

Damages are addressed by the Liability Convention and federal legislation. The Liability Convention requires state parties to compensate for damage caused by their space objects. If damage occurs beyond the surface of the Earth, compensation is required only in case of fault.

Companies applying for launch or re-entry licences in the USA are obligated to obtain liability insurance or demonstrate financial responsibility. Apart from this requirement, space operators are free to purchase additional types of insurance at their discretion.

Mandatory Insurance

In the USA, there is a risk-sharing regime and mutual indemnification between the federal government and launchers. Under Title 51, Chapter 509 of the United States Code, licensees are required to obtain liability insurance or demonstrate financial responsibility in the following amounts (per one launch or re-entry):

- up to USD500 million for third-party claims for death, bodily injury, property damage, or other loss resulting from an activity under the licence;

- up to USD100 million for damage or loss to government property resulting from an activity under the licence; or
- maximum liability insurance available in the world market at reasonable cost, if the amount is less than the applicable amounts mentioned above.

The licensees' insurance should also cover the government and its affiliates, the licensees' contractors, subcontractors, and customers, the customers' contractors and subcontractors, and space flight participants.

Further, the US government, licensee, and any other parties related to the launch, are required to sign a reciprocal waiver of claims. To the extent the government is involved, the waiver applies only to amounts above USD100 million (ie, in case of damages, the licensee would be required to compensate the government for any losses up to USD100 million).

In addition, the government will cover any successful claims against the licensee and its contractors/subcontractors exceeding the insurance amount of USD500 million, but not more than USD1.5 billion (plus additional amounts taking post-1988 inflation into account), except in cases of wilful misconduct by the licensee.

Optional Insurance

In addition to the mandatory insurance, companies often purchase manufacturing, pre-launch, launch, in-orbit, and other types of insurance which are often syndicated. The common package includes launch plus one year in-orbit insurance. Currently, the space insurance market is volatile, with premiums varying from 5% to 20% of launching costs, depending on the type of space object, reliability of the rocket, historical performance, scope of coverage, design, opera-

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tional lifetime, and other factors. Due to orbital debris and emerging experimental technologies, many insurers are reluctant to cover LEO satellites.

3. Rules Applicable to Space Operators' Activities

3.1 General Rules on Space Activities

The US regulatory framework does not include broad limitations on space activities, other than activities proscribed by the Outer Space Treaty, such as weapons of mass destruction in outer space and military activities on celestial bodies.

Commercial space activities in the USA are currently authorised and supervised by the United States Government through multiple licensing regimes: the FAA oversees and licenses space launch and re-entry activities, the FCC licenses the use of radiofrequency spectrum, and NOAA licenses the operations of private space-based remote sensing systems.

With regard to data processing, the United States Commercial Remote Sensing Space Policy (51 U.S.C 60101) delineates the licensing requirements for operators of private remote sensing space systems subject to US jurisdiction. Because US monitoring products and systems are valuable to its national security and foreign policy, the operation of commercial remote sensing space systems requires appropriate security measures, including licensing conditions (eg, delaying or restricting the transmission or distribution of data, obfuscation, encryption of the data, or other means to control the use of the data) and limits on data collection or dissemination during periods of increased national security concerns (15 CFR Part 960).

NOAA is authorised to license private sector parties operating private remote sensing space systems. The NGA is the primary agency responsible for acquiring commercial remote sensing space products and services for US national security and foreign policy requirements, and the Secretaries of Commerce and the Interior, as well as the Administrator of NASA, are primarily responsible for procurement of civil remote sensing space capabilities.

Additionally, the Communications Act of 1934, an expansive statute regulating the US communications and broadcasting industry, imposes data privacy and security requirements on cable operators and satellite carriers.

With regard to cybersecurity, although the US regulatory framework does not specifically address cybersecurity risks, there are various guidelines and soft law mechanisms to help private businesses and organisations manage cybersecurity risks in space operations. For example, the National Institute of Standards and Technology (NIST), an agency within the DOC, has developed a voluntary Hybrid Satellite Network Cybersecurity Framework, intended to provide a foundational set of guidelines for organisations operating space systems. The purpose of the framework is to provide practical cybersecurity-related guidance for organisations and stakeholders engaged in the design, acquisition, and operation of satellite buses or payloads. Additionally, the Space Information Sharing and Analysis Center ("Space ISAC") monitors emerging threats in the space sector and aims to provide an increased capability for collection, analysis, and dissemination of actionable information for the space community.

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3.2 Principles of Non-interference and Prevention of Harmful Interference

The United States has in place legislation and rules aimed at preventing harmful interference, regulated and enforced throughout its various governmental agencies.

In line with its commitments under the ITU Radio Regulations and ITU Constitution (No 197 of Article 45), which provide that stations must operate in such a manner as to not cause harmful interference to radio services or communications of other Members, the FCC has in place rules and regulations implementing the ITU and prohibiting harmful interference. 47 C.F.R. Part 25 covers satellite communications and includes authorisation requirements from the FCC as well as protection from impermissible levels of interference with other systems. For example, operators of space stations applying for a licence must prove that the space station can be commanded “to immediately cease transmissions,” and that the operator is capable of eliminating harmful interference when required (47 CFR 25.123(b)(8)).

Additionally, any person or entity subject to US jurisdiction (ie, operators launching from the territory of the USA, US citizens, or entities organised under US law) must obtain a licence from the FAA. In order to obtain and maintain a launch licence, operators must adhere to the FAA regulations. Generally, a launch or re-entry operator “must prevent the collision between a launch or re-entry vehicle stage or component and people or property on orbit” (14 CFR 450.101(e)). The FAA Launch Safety Regulations also include various obligations for operators, including undertaking safety measures (eg, launch plans, rehearsals, tests, and reviews) and reporting requirements, to ensure launch vehicles’ processing and flights are conducted without adversely affecting public safety (14 CFR Part

417). Additionally, the FAA regulations include launch and re-entry collision avoidance analysis requirements, under which operators must meet certain collision avoidance requirements (14 C.F.R. 450.169) and critical asset protection requirements (14 C.F.R. 450.101(a)(4) and (b)(4)) for orbital or suborbital launches and re-entries.

The OSC is currently developing a Traffic Coordination System for Space, to provide space situational awareness data and services to civil and private space operators and to promote space-flight safety, sustainability, and operation in outer space free from physical or radio-frequency interference.

Section 11 of the Artemis Accords reiterates signatories’ commitment to the Outer Space Treaty’s provisions relating to due regard and harmful interference. Signatories commit to seek to refrain from any intentional actions that may create harmful interference with each other’s use of outer space in their activities under the Accords. The Accords include information-sharing, best practices, and the creation of safety zones in order to minimise harmful interference.

3.3 Operators’ Responsibilities

Although the USA does not have ESG guidelines that apply to space activities, it does impose certain environmental requirements with regard to launch and re-entry, as well as responsibilities over operators with respect to orbital debris. Additionally, the USA has in place frameworks aimed at preserving and protecting lunar heritage sites.

Launch and Re-entry Requirements

As stated in 3.2 Principles of Non-interference and Prevention of Harmful Interference, the FAA prescribes requirements for obtaining and maintaining a licence to launch and/or re-enter

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a launch or re-entry vehicle. These include several conditions and obligations for applicants, including following the application procedures delineated in 14 C.F.R. Part 413, obtaining policy and safety approvals, satisfying environmental review requirements, and more.

The Commercial Space Launch Amendments Act of 2004 provided the FAA with the authority to regulate the launch and re-entry of commercial spacecraft for the safety of involved parties, following a learning period, which has been extended several times. Upon the expiration of the learning period, the FAA will be able to impose licensing requirements on commercial human spaceflight operations to ensure the protection of human occupants.

Notably, the FAA's authority under the safety regulations (51 U.S.C. §50905(c)) is not subject to the learning period. Therefore, the FAA may impose certain restrictions, prohibit design features, or preclude operating practices when those have resulted in, or pose a high risk of, serious or fatal injury. The FAA may also impose requirements for spacecraft crew to protect public safety (14 C.F.R. §460), and the agency has established requirements regarding crew qualifications, medical screening, life support, and other safety elements. Additionally, 14 C.F.R. §460.45 requires disclosure of potential risks to commercial spaceflight participants.

Operations in orbit, following launch and prior to re-entry, are currently not under FAA jurisdiction.

Orbital Debris

FAA regulations require each licence application to contain a flight safety analysis characterising any hazardous debris that would be generated from vehicle flight, including a quantitative description of any physical, aerodynamic, and

harmful characteristics of the hazardous debris. Additionally, the analysis must account for the distribution of people for the region where there is a significant probability of impact of hazardous debris. Operators must comply with FAA Orbital Debris Mitigation requirements for all vehicles or components that reach Earth orbit (14 C.F.R. Part 450). Notably, in December 2023, the FAA published a Notice of Proposed Rulemaking (NPRM) which, if passed, would mandate the removal of segments of commercial launch vehicles that reach orbit, along with other components resulting from launch or re-entry, within 25 years after launch.

In July 2022, the National Science and Technology Council's Orbital Debris Interagency Working Group Subcommittee on Space Weather, Security, and Hazards, issued a National Orbital Debris Implementation Plan. This plan aims to provide guidance and ensure governmental co-ordination in addressing orbital debris challenges, and outlines action items for US governmental agencies on orbital debris mitigation, tracking and characterisation, and remediation.

The FCC also adopted a comprehensive set of regulations which impose certain debris mitigation obligations, plans, and disclosure requirements on satellite communication providers (47 CFR 25). Under the FCC's rules, applicants for satellite licences and entities requesting access to non-US-licensed space stations must submit an orbital debris mitigation plan to the Commission in connection with its request. The required mitigation plan must include design and operational strategies intended to mitigate orbital debris.

Notably, in 2023, the FCC initiated its first enforcement action for an alleged failure to mitigate orbital debris. The case involved an opera-

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tor's failure to place its satellite in a specified disposal orbit altitude in violation of the commitment made in its orbital mitigation plan.

With regard to end-of-life disposal requirements, in October 2023, the United States Senate unanimously passed the Orbital Sustainability Act, which if passed by the House and signed into law would establish a programme for the removal of debris from orbit and advance the development of required technologies to remediate orbital debris.

Lunar Heritage Sites

The United States, through its Apollo missions, has over the years created lunar sites and artifacts which hold great historic, cultural, and scientific value. The US government recognises the importance of protecting and preserving the Apollo sites, especially in light of the increasing number of crewed and uncrewed lunar missions in the upcoming years.

In 2011, NASA published recommendations for "space-faring entities" concerning the protection and preservation of US government lunar artifacts. Subsequently, in December 2020, Congress enacted the One Small Step to Protect Human Heritage in Space Act, requiring NASA to incorporate these recommendations into its contracts with partners, and to communicate relevant information to federal agencies relating to the principle of due regard and the limitation of harmful interference with historic lunar landing sites. In October 2022, NASA's Office of Technology, Policy, and Strategy (OTPS) released a Lunar Landing and Operations Policy Analysis, proposing additional measures to conserve lunar landing sites. Furthermore, NASA integrated outer space heritage site preservation into the Artemis Accords, wherein signatories pledge to uphold and contribute to the development of

international practices and rules aimed at safeguarding outer space heritage.

4. Ownership of Extraterrestrial Resources

4.1 Nature of Space Resource Rights

In 2015, Congress passed the Competitiveness Act, designed to encourage commercial spaceflight and innovation by, inter alia, granting private companies the right to own resources collected in space. This Act was the first domestic law to authorise the exploitation of space resources by private actors. While the USA is subject to obligations under the Outer Space Treaty, including the principle of non-appropriation of territory, the USA and numerous other signatories hold a longstanding view that the utilisation of space resources is consistent with the Outer Space Treaty.

Title IV of the Act, also named the "Space Resource Exploration and Utilization Act of 2015", describes the right of US citizens to engage in commercial exploration and recovery of space resources free from harmful interference, subject to authorisation and supervision by the federal government (51 U.S.C. 51302). Moreover, the Act asserts that US citizens are entitled to any asteroid resource or space resource obtained (51 USC 51303).

In April 2020, the President issued Executive Order (EO) 13914, which underscores US policy regarding the recovery and use of resources, such as water and certain minerals, in outer space, and clarifies that the USA does not view outer space as a "global commons".

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4.2 Granting of Rights to Space Resources

In line with the Space Resource Exploration and Utilization Act of 2015 (51 U.S.C. 51302(b)), the President issued EO 13914, providing that the Secretary of State, in consultation with the Secretary of Commerce, the Secretary of Transportation, the Administrator of NASA, and the head of any other appropriate executive department or agency, shall take all appropriate measures to encourage international support for the public and private recovery and use of resources in outer space. In carrying out this responsibility, the Secretary of State shall seek to negotiate joint statements and bilateral and multilateral arrangements with foreign states regarding safe and sustainable operations for the public and private recovery and use of space resources.

Additionally, the Artemis Accords implement principles related to the extraction and utilisation of space resources, affirming the US view that the extraction of space resources does not constitute national appropriation (Section 10(2)). Section 10(4) of the Accords further states that signatories intend to develop international practices and rules applicable to the extraction and utilisation of space resources.

In line with this, NASA initiated several space activities to leverage commercial involvement and generate new practices relating to the commercial extraction and sale of space resources, including public-private partnerships for missions involving the collection of space resources.

5. Environmental Protection and Impact on Climate Change

5.1 Environmental Protection in Space

The US regulatory regime underscores the importance of space operations and missions being conducted in a manner that would ensure that the outer space environment remains suitable for exploration and use by current and future generations, as well as the long-term sustainability of space activities. This effort is evident, for example, in US regulations aimed to mitigate, track, and remediate space debris (see 3.3 Operators' Responsibilities).

The National Environmental Policy Act of 1969 (NEPA) was the first major environmental law in the United States, and it requires federal agencies to assess the environmental effects of proposed major federal actions prior to making decisions. NEPA established the Council on Environmental Quality (CEQ) to ensure that federal agencies, such as NASA, meet their obligations.

NASA implements the NEPA through 14 CFR Part 1216 Subpart 1216.3 ("Procedures for Implementing the National Environmental Policy Act"). Some of the key rules outlined in these procedures include conducting environmental impact statements to evaluate the potential environmental impacts of proposed projects and activities, preparing environmental assessments for proposed actions without expected significant effects or when the significance of the effects is unknown, and developing and implementing mitigation measures to minimise adverse environmental impacts.

Additional federal laws that regulate space-related activities on Earth include the Clean Air Act, the Safe Drinking Water Act, the Resource Con-

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ervation and Recovery Act, and the National Historic Preservation Act.

The body in charge of developing policies and providing guidance on environmental issues at NASA is the Environmental Management Division (EMD).

5.2 Climate Change and Space Activities

NASA has a broad climate research programme, involving studies and information gathering in various areas such as solar activity, sea level rise, air pollution, ocean ecology, and more. Initially charged with conducting aeronautical and space activities as they relate to phenomena in the atmosphere and space, over the years NASA's research shifted to include energy efficiency, pollution, ozone depletion, and climate change. Currently, NASA is developing the Earth System Observatory, which is comprised of five satellite missions providing critical data on climate change, severe weather and other natural hazards, wildfires, and global food production.

NOAA and the United States Geological Survey (USGS) also carry out climate change related space activities.

NOAA's mission is to observe, collect, and analyse environmental data, and the agency holds a key role in policymaking concerning issues related to climate and weather. NOAA has in place various research programmes, educational projects, and resources aimed at providing climate services and information to decision-makers and the community. NOAA's operations with respect to climate include collaborations with coastal communities to adapt to sea level rise, drought warnings, predictions and services related to water resources, and development of strategic plans to tackle the climate crisis.

The USGS is the scientific agency of the United States Department of the Interior (DOI), which utilises, inter alia, space-based Earth observation, to provide scientific data and support decision-making on environmental, resource, and public safety issues.

6. Taxation of Space Activities

6.1 Tax System for Space Activities

The Internal Revenue Code of 1986 and the regulations thereunder define space activity as "any activity conducted in space", while space is defined as "any area not within the jurisdiction of the United States, its possessions, or a foreign country" (IRC § 863(d); Treas. Reg. § 1.863-8(d)). Space activity includes performance of services in space, leasing of equipment located in space (eg, spacecraft and satellites), licensing of intellectual property for use in space, production of property in space, certain communications occurring in space, sales of property in space, and underwriting income from insurance of risks on activities that produce space income (Treas. Reg. § 1.863-8(d)(1)(i)).

A United States person (ie, corporation or individual) is taxed on income wherever earned. However, if a US person earns space income, the source of such income will be treated as foreign only to the extent the facts and circumstances demonstrate that the functions performed, resources employed, or risks assumed are in a foreign country (Treas. Reg. § 1.863-8(b)(1)).

Space income derived by a controlled foreign corporation of a US person is treated as US source income and subject to US tax, unless the facts and circumstances demonstrate it is attributable to foreign sources. The normal Controlled

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Foreign Corporation (CFC) rules apply if the space income is from a foreign source. Space income derived by a foreign person engaged in a US trade or business is considered US source income to the extent the facts and circumstances show the activities are attributable to activities performed within the United States. US taxpayers must also allocate expenses based on the sourcing rules.

Space activities do not include income from: (i) activities giving rise to transportation income; (ii) international communications; (iii) activities with respect to mines, oil and gas wells, or other natural deposits if located in the United States or a foreign country (Treas. Reg. § 1.863-8(d)(3)).

6.2 Tax Incentives for Space Investors

No tax incentives exist in the USA for investing in space activities, other than research credit. The research credit is generally applicable to activities and can apply to research and development in space.

6.3 Taxation on Sale or Transfer of Space Assets

Taxpayers follow the sourcing rules (see 6.1 Tax System for Space Activities) for the sale of purchased property where the purchased property is sold in space. If purchased property is treated as inventory and is sold for use, consumption, or disposition outside space, the source of the income will depend on the regulations in Treas. Reg. 1.861-7(c).

The rules are different for the sale or transfer of property that is manufactured by the taxpayer. The sourcing rules will depend on whether the property is produced only in space or both in and outside of space. If produced solely within space, then the above sourcing rules apply. For property produced both in and outside of space,

the source of gross income is allocated based on all of the facts and circumstances related to the space production activities and the non-space production activities. Then, the sourcing rules apply to categorise domestic or foreign source income (Treas. Reg. § 1.861-8(b)(3)).

7. Investment and Financing in Space Activities

7.1 Impact of “NewSpace”

The private space industry, or “NewSpace”, is highly prevalent in the United States and is continuously evolving. Historically, the space sector relied on government funding, but significant changes have occurred over the past decades facilitating private investment in the industry. These include:

- technological progress facilitated by federal investment;
- a more streamlined regulatory environment;
- a commitment to purchasing from and partnering with the commercial sector; and
- the development of a broader commercial space ecosystem that has enabled further growth.

The US space industry is characterised by the commercialisation of the space sector, facilitating the emergence of new companies and start-ups supported by private investments. This framework enables numerous companies to undertake and develop unprecedented activities, such as space mining, space solar power, and the removal of space debris. The development of technologies and innovations in the NewSpace sector creates new commercial opportunities and expands access to space for various entities, including start-ups, academic institutions, and private individuals.

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The NewSpace industry has also attracted the attention of venture capital (VC) funds, particularly focusing on emerging technologies such as reusable rockets, space tourism, novel satellite networks, and in-space manufacturing. Numerous start-up companies and newly established businesses in the space industry are experiencing unprecedented investments from angel and VC funds.

US space agencies, such as the Space Force and NASA, are actively supporting the development of commercial space technologies, including orbital debris removal systems.

Notably, a substantial percentage of capital today is directed towards NewSpace, and some VC firms specialise exclusively in the space community. Moreover, there is a growing interest in the space industry among VC firms focusing on defence technology and national security.

7.2 Finance Sources for Space Activities

Space activities in the United States are funded through a combination of public and private financing channels.

Regarding US government funding, governmental bodies such as NASA and the United States Space Force allocate annual budgets that detail funding allocations for programmes and initiatives encompassing human spaceflight, space science, aeronautics, technology advancement, and educational activities. These governmental entities frequently engage in collaborative efforts with the commercial space sector, aiming to streamline costs and ensure supply chain resilience while fostering research and development in pivotal technological domains critical to US national security objectives.

Additionally, private investment constitutes a significant portion of funding within the space industry. Various strategies are employed by space companies to secure private capital, including:

- **Venture capital funds:** The increasing technological innovations and business prospects within the space domain have spurred the emergence of numerous VC-backed start-ups throughout the space supply chain (see **7.1 Impact of “NewSpace”**).
- **Special-purpose acquisition companies (SPACs):** SPACs serve as vehicles for private enterprises to merge with, or be acquired by, publicly traded entities. SPACs provide avenues for space companies to access stock market funding, and a multitude of NewSpace ventures have garnered funding through utilising SPACs. Notably, the SPAC market in the US space sector has been struggling over the past few years, with most shares underperforming (see **7.5 Role of Securities Markets in Space Financing**).
- **Leveraging existing federal funding:** Companies receiving federal funding can leverage their contractual engagements with the government to tap into private markets.
- **Partnerships:** Many aerospace firms forge alliances with private investment entities. These collaborative ventures prove mutually advantageous, enabling companies to access capital for development while providing investment firms with access to novel technologies, expertise, and industry affiliations.
- **Space asset finance:** Currently, new sources of funding are emerging for space activities, in an attempt to fill in the financing void that has arisen due to challenges with traditional space financing methods. One such source is debt financing through the space asset market. Similar to financing methods in related

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industries such as aviation and maritime, space asset finance transactions provide secured debt capital for space assets (such as satellites and other space vessels) with a repayment schedule.

7.3 Attracting Investment for Space Activities

Federal and state incentives play a crucial role in the attraction of investments into space activities and support of the space industry amid a challenging and changing US macroeconomy. Government demand for space capabilities is one of the factors that boosts interest among private parties.

On the federal level, several departments and independent agencies provide early funding, contracting opportunities, and partnership programmes.

Every year, NASA consolidates its anticipated procurements in the Acquisition Forecast with the aim of increasing industries' advance knowledge of NASA requirements and needs. Through Space Act Agreements, its most common legal instrument, NASA regularly enters into reimbursable and nonreimbursable partnerships with early-stage start-ups and experienced market players. Also, utilising procurement contracts, NASA acquires property or services for the direct benefit of the federal government. NASA uses its Commercial Lunar Payload Services and the second Collaborations for Commercial Space Capabilities initiatives to co-operate with the private sector.

Further, under Small Business Innovation Research and Small Business Technology Transfer initiatives, NASA, the DOT, and the DOD award contracts to domestic small businesses to pursue research on, and develop, innovative

solutions. As a result, such companies become more attractive for private investors. The Department of Energy, the DOC, and the DOD also have their own initiatives that attract investment into civil and defence space sectors.

The US government is committed to creating a favourable investment environment through modernising the current oversight regime, simplifying the licensing process, and providing a consistent approach with non-duplicative government functions.

On the state level, nearly all spaceport states offer space launch incentives, from tax exemptions and transferable tax credits for space operators, to local financial assistance for space launch infrastructure.

7.4 Foreign Investment in Space Activities

The Committee on Foreign Investment in the United States (CFIUS) is an interagency committee chaired by the Secretary of the Treasury authorised to review specific foreign investment transactions in the United States that present national security concerns. Among its responsibilities, CFIUS is authorised to assess certain non-passive, non-controlling foreign investments in US businesses engaged in critical technologies, critical infrastructure, or the personal data of US citizens (referred to as "TID businesses"). The rationale behind scrutinising such non-controlling investments lies in the potential for foreign investors to gain access to sensitive technical data or participate in decision-making processes related to technology, infrastructure, or data management. Certain covered transactions involving "TID businesses" necessitate reporting to CFIUS via either a declaration or a formal notice filing.

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Given the substantial capital required for space activities, which is often sourced internationally, coupled with the inherently sensitive nature of the space sector characterised by dual-use technologies (ie, technologies applicable for both military and civilian purposes), there is a high likelihood that space-related ventures entail critical technology, thereby triggering CFIUS oversight and, in some instances, mandatory reporting obligations. Consequently, CFIUS regulations pertaining to foreign investment in critical technologies impose heightened regulatory requirements on the private space industry, rendering it more challenging for space companies to secure funding from foreign investors.

7.5 Role of Securities Markets in Space Financing

The number of US space companies going public is relatively low. Large, well-known market players tend to self-finance their space projects or use other financing instruments available to them, while the public market is dominated by early-stage start-ups.

Out of those publicly traded companies, some prefer listing shares through a traditional IPO process, however, about 90% go through SPAC mergers, which often bring questionable results for early-stage space firms, missing revenue targets and significantly underperforming on the public market.

Trends and Developments

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Holland & Knight LLP

Holland & Knight LLP provides a full suite of legal, regulatory and legislative services to entrepreneurs, start-up companies and global industry players. The firm's satellite and space technology team couples its decades of industry-focused experience with its full-service and cross-border capabilities to advise on virtually every significant area within the satellite and space technology industry. The team includes approximately 20 attorneys located in Washington, DC, the Florida Space Coast, Colorado, Texas, California and other key markets, and features several team members who have held high-level US government positions that are rel-

evant to the industry. The firm has particularly deep experience in structuring space-related transactions, navigating the patchwork of complex and multi-agency regulations impacting the space industry, and advising early-stage and growth-stage technology companies on corporate formation and structuring, as well as in counselling other market participants in regulatory and legislative matters, corporate transactions, national security and export controls matters, investigations and litigation.

Anna Vizniak, an international law clerk, was an additional key contributor to this submission.

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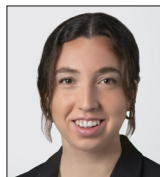
USA TRENDS AND DEVELOPMENTS

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The space and satellite industry is a diverse mix of companies and technologies ranging from more traditional, such as telecommunications, satellite imagery, and scientific experiments, to new space applications and companies, such as those exploring space debris removal, on-orbit servicing of satellites, asteroid and lunar mining and space tourism. As the space economy grows and evolves, the legal, regulatory, and policy issues confronting market participants are similarly dynamic. Below, our team highlights several trends and developments impacting the space and satellite sector, including businesses, entrepreneurs and investors in the USA and globally.

New Participants in the Space Economy Face a Strong Regulatory Headwind for Raising Capital and Getting to Market

Satellite and space technology has evolved from a niche field comprised of specialist lawyers to a robust space economy that touches virtually all areas of law. There has now been USD286 billion invested into 1,779 unique space companies since 2015. McKinsey & Company estimates that the global space economy will be worth USD1.8 trillion by 2035.

Growth drivers include increased venture capital (VC) spending (including the development of specialty VCs focused on the space and satellite verticals), increased US government spending, greater connectivity via satellites, higher demand for positioning and navigation services on mobile phones, increased demand for insights powered by AI and machine learning, and international interest from investors in a capital intensive industry.

This last factor – foreign investment in US space and satellite start-ups and emerging companies – has been an acute focus of US regulators. The

Committee on Foreign Investment in the United States (CFIUS) is a federal government interagency committee with broad authority to review, approve and block certain foreign investments in US businesses, including in start-ups and early-stage companies, if the investment poses risks to national security.

Many founders and early-stage company executives believe that a financing round that will only involve small stakes from foreign investors will not confront regulatory scrutiny. This is not always the case. Several years ago, CFIUS expanded its jurisdiction to include certain non-controlling investments (even under 10%) in companies that (i) work with particularly sensitive technologies; (ii) own, operate or support US critical infrastructure such as financial services or telecommunications providers or (iii) have access to certain sensitive personal data of US citizens. Collectively, these categories are known as “TID US businesses” for critical technologies, critical infrastructure and sensitive personal data. For CFIUS to have jurisdiction over minority investments in TID US businesses, the foreign investor must receive certain non-passive rights (eg, access to certain material non-public technical information, board membership or observer rights, or involvement in decision-making regarding sensitive aspects of the company).

Moreover, there are a subset of foreign investments that trigger mandatory CFIUS filings. With certain limited exceptions, mandatory filings are required when a foreign person is afforded “control” of or certain non-passive rights set forth above with respect to a US business that “produces, designs, tests, manufactures, fabricates, or develops” any “critical technology” (ie, technology controlled in certain ways under US export control laws). Of course, a large number

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of space and satellite companies are involved in precisely the variety of in-scope export controlled technologies that can trigger mandatory CFIUS filings.

At bottom, it is never too early for start-up companies contemplating early-stage financings to conduct detailed diligence on potential investors interested in coming onto the cap table. There are options for structuring a transaction to facilitate immediate foreign investment in your business but it is important to discuss with legal counsel the kinds of rights you can grant in your company that may raise alarm bells with CFIUS.

Export Control Reforms Will Facilitate Enhanced Defence and National Security Trade for the Space and Satellite Industry *Changes to the export administration regulations*

On 19 April 2024, the Bureau of Industry and Security (BIS) of the United States Department of Commerce published an interim final rule which amends the Export Administration Regulations (EAR) and reduces licensing requirements on exports to Australia and the United Kingdom. The aim of this rule is to enhance technological innovation among the three countries and support the goals of the AUKUS Trilateral Security Partnership. The interim rule, effective immediately, puts forward several policy changes relating to export controls to ensure that Australia and the UK will have nearly the same licensing treatment as Canada under the EAR. These changes, which will have a profound impact on the space and satellite industry, could serve as models for other countries looking to facilitate global commerce among key emerging defence technology markets.

The interim rule involves removal of list-based licence requirements for exports, re-exports,

and transfers (in-country) to Australia and the UK for national security column 1 (NS1), missile technology column 1 (MT1) and regional stability column 1 (RS1) reasons. As Australia and the UK are not currently subject to NS2 or RS2 controls, with this rule all Commerce Country Chart-based NS and RS controls are removed for these countries. The implications of this change include:

- removal of licensing requirement for “600 series” items (ie, items previously controlled under the International Traffic in Arms Regulations, or that are included on the Wassenaar Agreement Munitions List) to Australia or the UK;
- items controlled under the EAR for missile technology reasons will no longer require a licence to Australia or the UK;
- most 9x515 satellite-related items (ie, dual use satellite technologies removed from USML Category XV and added to the CCL) will no longer require a licence to Australia or the UK; and
- removal of licence requirements for 0A919 items (“Military commodities” located and produced outside the USA) to Australia and the UK.

Moreover, the interim final rule involves removal of military end-use and end-user-based licence requirements for exports, re-exports, and transfers (in-country) of certain cameras, systems, or related components, subject to the EAR (15 CFR 744.9(a)(1)(i) and 15 CFR 744.9(a)(1)(iii)).

A final major change to the dual-use export control regime involves revision of BIS’s treatment of significant items (SI) (ie, hot section technology for the development, production or overhaul of commercial aircraft engines, components, and systems) and related controls to allow these items to be exported, re-exported, or trans-

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ferred (in-country) to or within Australia and the UK without a licence.

These changes will significantly reduce the volume of BIS licences for exports, re-exports, and transfers to and within Australia and the UK, as BIS previously issued over 1,800 licences per year for such items to Australia and the UK.

Changes to the International Traffic in Arms Regulations (ITAR)

In line with this development, on 1 May 2024, the United States State Department issued a proposed rule to amend the ITAR to support the goals of the AUKUS partnership. The following are the key aspects of the proposed rule:

- DDTC proposes to amend the ITAR to add a new exemption in Part 126 to allow exports, re-exports, re-transfers, or temporary imports of defence articles; the furnishing of defence services; or engaging in brokering activities between and among previously approved parties (“authorised users”) in Australia, the UK, and the United States (“AUKUS Exemption”). The proposed rule includes a number of limitations, including a new Excluded Technology List identifying defence articles and services that would not be eligible for transfer under the new AUKUS exemption.
- The rule further provides that any application submitted for the export of defence articles or services to Australia, the UK, or Canada, that does not qualify for an exemption, will be expeditiously processed by the State Department.
- Finally, DDTC proposes to expand the scope of an existing ITAR exemption for intra-company, intra-organisation, and intra-governmental transfers to allow for the transfer of classified defence articles to certain dual nationals who are authorised users or regular

employees of an authorised user within the UK and Australia.

Implications for the space and satellite industry

Both of these rules signify the US commitment to the AUKUS security partnership and would assist in the promotion of defence trade and co-operation between the USA, the UK, and Australia. The loosening of export controls on certain dual use and defence technologies to Australia and the UK will likely impact the space and satellite industry in several ways.

First, for UK-based and Australia-based companies currently contemplating collaboration with US-based space and satellite companies, a licence will be required in fewer instances (for both companies falling under the jurisdiction of the EAR and the ITAR). This will enable greater sharing of hardware, software, and technical data between the USA, and companies located in Australia and the UK.

Second, the rule changes will ease the regulatory and compliance burden on US companies doing business with counterparties in Australia and the UK (whether vendors, suppliers, customers, or other entities), as well as non-US companies based in these countries that utilise US technology (which would otherwise be controlled).

Third, the changes will have impacts under CFI-US. As discussed above, because mandatory CFIUS “critical technology” filings are linked to export controls, the new rules will also narrow the circumstances in which a US investment from Australia or the UK will trigger a mandatory CFIUS filing. Specifically, a mandatory CFIUS filing can be triggered by foreign investments in US businesses where the US business manu-

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factures or develops any “critical technology” that would require a licence for export to the country of the investor. “Critical technologies” are defined, in part, as items controlled on the Commerce Control List for NS, MT or RS reasons. The removal of NS, MT and RS controls for Australia and the UK will reduce the scope of critical technology controlled to those countries, thereby narrowing the mandatory CFIUS filing requirement with respect to investments by Australian and UK investors.

In-Space Authority

Article VI of the Outer Space Treaty states that “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities... The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty”. While the United States has long maintained that it complies with Article VI, as commercial activity in space has increased and diversified, a debate has arisen about whether and how best to expand federal oversight of in-space activity.

At present, federal authority is limited to licensing launch and reentry (led by the Federal Aviation Administration (FAA)); use of spectrum (led by the Federal Communications Commission (“FCC”)); and Earth observation (led by the National Oceanographic and Atmospheric Administration (NOAA)). The federal government does not currently license, or prohibit, other in-space activity, such as operating a space station for research and tourism, mining asteroids, or servicing satellites. Many space operators are comfortable with this arrangement, but some

have complained that no federal agency is authorised to say “yes” to a proposed in-space activity, and that the resulting ambiguity slows progress.

Within the federal government, a consensus has been building that one or more agencies should have the role of authorising and supervising commercial activity in space. Precisely which agency, and under which circumstances, remains unsettled. The leading contenders to hold this authority are the Office of Space Commerce within the Department of Commerce and the Office of Commercial Space Transportation within the FAA, which is itself part of the Department of Transportation. US commercial space operators have tended to strongly prefer the Department of Commerce, because commercial activity in space will be much broader than transportation, and because the Department of Commerce is seen as likely to be more interested in promoting commercial activity and less heavy-handed in its regulation than the Department of Transportation.

The Committee on Science, Space, and Technology in the House of Representatives in November 2023 marked up and favourably reported the Commercial Space Act of 2023, which would give in-space authority to the Department of Commerce. On the day of the markup, however, the Biden Administration released a proposal to split in-space authority between the Department of Commerce and the Department of Transportation, with the latter in charge whenever a human is involved. Although the Administration’s proposal has not gained traction in Congress, it remains to be seen whether the House’s approach will become law.

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Debris Mitigation, Tracking, and Remediation

The advent of commercial megaconstellations numbering in the thousands of satellites has increased federal attention to the question of how to mitigate, track, and remediate debris in space. At best, debris requires satellites and spacecraft to use scarce fuel to manoeuvre to avoid a destructive collision. At worst, undetected debris could incapacitate or destroy a satellite or spacecraft, kill an astronaut, or create a chain reaction that renders an entire orbit unusable. The federal government has begun considering how to require that commercial space operators take steps to ensure that they will not create debris. In the longer term, agencies are also examining potential options for debris cleanup.

In 2022, the White House National Science and Technology Council's Orbital Debris Working Group released a National Orbital Debris Implementation Plan. The plan addresses mitigation, tracking and characterisation, and remediation of debris.

The Senate has passed the ORBITS Act of 2023, which would direct the Office of Space Commerce to publish a list of high-risk debris, establish a NASA debris removal demonstration programme, initiate a multi-agency process for updating orbital debris standards that apply to government systems, and require the Office of Space Commerce to encourage the development of space traffic coordination practices to help avoid debris-causing collisions.

The Commercial Space Act of 2023 takes a relatively laissez-faire approach to debris mitigation, requiring commercial space operators to submit a debris mitigation plan as part of their application for a certification to operate. The bill contains no provision for evaluation of the plan,

or for enforcement in the event that an operator fails to adhere to the plan.

Among the proposals being considered for debris mitigation are requirements that space operators acquire insurance or post bonds to cover damage they may cause by creating debris, as well as mandates to include thrusters and other debris mitigation features. Some space operators have objected that these requirements would constitute a barrier to entry, or that they are inappropriate for small satellites whose orbits will degrade naturally in a relatively short time.

The FCC, on the other hand, continues to take a more active, and stricter, role in mitigating orbital space debris. Though the regulation of space debris does not directly relate to the FCC's core jurisdictional authority over radio communications, the agency has concluded that the Communications Act grants it sufficient ancillary authority to regulate orbital debris. For instance, because orbital debris potentially impairs the ability of other satellite systems to utilise spectrum to the full extent authorised by their licences, the FCC has found that its mitigation rules advance the Act's requirement that the FCC encourage "the larger and more effective use of radio in the public interest."

The FCC first adopted minimal debris mitigation regulations in 2004, requiring a satellite operator to submit with any satellite licence application an orbital debris mitigation plan, which would then be made a binding condition on the satellite operator's licence. Otherwise, the FCC remained rather inactive in this realm until it amended the debris mitigation regulations in 2020 and again in 2022. In part, those amendments require satellite applicants to be more specific in their debris mitigation plans and mandate that any operator

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ending a satellite's mission in or passing through the low-Earth orbit region to deorbit the satellite as soon as practicable and no more than five years following mission completion. Previously, there had been only a 25-year "guideline" for deorbiting satellites post-mission.

Then, in 2023, the FCC for the first time initiated an enforcement action for an alleged violation of its orbital debris mitigation rules, ultimately entering into a consent decree with a satellite operator regarding the operator's failure to place one of its satellites in the high-altitude disposal orbit called for in its debris mitigation plan. More than a decade prior, the FCC had required the operator to submit, and commit to, the mitigation plan before the FCC would process the operator's application seeking renewal of its existing licence for this satellite.

In January 2024, after denying requests to reconsider the stricter orbital debris mitigation regulations adopted in 2020, the FCC provided guidance to satellite operators on compliance with the agency's orbital debris mitigation policies, including on methods for conducting a re-contact risk analysis. The FCC also clarified various aspects of its policies, including with respect to the satellite manoeuvrability disclosure requirements, the use of "free-flying" deployment devices, the 0.99 disposal reliability goal for large satellite systems, and how the orbital debris rules apply to non-US-licensed satellites.

The FCC appears poised to continue strengthening its debris mitigation regulations in the near future. For instance, in May 2024, FCC Chairwoman Jessica Rosenworcel called on the agency's other commissioners to support a proposal designed to limit the risks posed by accidental explosions in space by adding a specific,

quantitative metric that satellites must meet. The proposed rules specifically would require each satellite applicant to assess and limit the probability of a debris-generating accidental explosion to be less than 1 in 1,000. As the FCC continues to adopt stricter orbital debris mitigation regulations, and to interpret its existing regulations more stringently, additional enforcement actions against satellite operators are likely to follow.

Addressing Congestion

In addition to taking steps to mitigate the amount of orbital space debris, the FCC has taken a number of other actions designed to address congestion in application processing, in orbit, and in spectral capacity brought on by the significant increase in space activity in recent years. For instance, in 2023, the FCC established a dedicated Space Bureau, which now leads the agency's policy and licensing matters related to satellite and space-based communications and activities. Further, to help address the growing backlog of pending licence applications, the FCC adopted rules in 2023 to expedite the processing of licence applications for new satellites and satellite earth stations. Among other things, these new rules impose specific timeframes for the FCC to place applications on notice for public comment, which is a prerequisite to the FCC granting a licence for a new satellite or earth station.

To help address the interference challenges related to an increasingly crowded orbital environment, also in 2023, the FCC limited its default spectrum-splitting procedures to non-geostationary satellite orbit, fixed-satellite service (NGSO FSS) systems approved in the same application processing round. The new rules grant primary spectrum access to systems approved in earlier processing rounds, limiting certain sharing procedures to systems

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approved in the same processing round. Subsequently authorised systems are now required to co-ordinate with, or demonstrate they will protect, earlier-round systems. The protections granted to earlier-round systems, however, will not be permanent, but instead will sunset after specified periods of time.

Other FCC actions relate to easing the increasing spectral congestion resulting from a greater number of operational satellite communications systems, the increased bandwidth required for these advanced systems, and the difficult coexistence of satellite and terrestrial mobile systems operating in the same, or even adjacent, spectrum bands. For instance, while the mandatory process of relocating FSS operations out of the 3.7-4.0 GHz band to make room for new terrestrial mobile operations concluded in 2023, the FCC subsequently declined to authorise terrestrial mobile operations in the 12.2-12.7 GHz band, concluding that the risk of interference to the incumbent satellite operations in that band was too great.

Also in 2023, the FCC adopted new rules to ensure commercial space launches have the spectrum resources they need for reliable communications. Among other things, the new rules authorise ground-to-launch vehicle telecommand operations in the 2025-2110 MHz band and make the 2200-2290 MHz band available for launch telemetry. In the near future, the FCC likely will begin its consideration of expanding satellite operations in the 18.1-18.6 GHz band, an action called for in the National Spectrum Strategy released by the Biden Administration in November 2023.

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