

THE SPACE LAW
REVIEW

THIRD EDITION

Editor
Joanne Wheeler MBE

THE LAWREVIEWS

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REVIEW

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PREFACE

Over the past year, we have increasingly looked upwards – to consider the ‘mega-constellations’ being launched to bring us internet broadband in the remotest places; to reflect on the increasing issue of space debris; and to opine on news reports describing new space technology observing Earth, climate change and human activities, down to a couple of centimetres. Perhaps we are also seeking to track the International Space Station and other objects in space as more humans explore this final frontier. Whatever the reason, outer space is increasingly on our minds and in our conversations and news stories, and is used by us on Earth in more sophisticated ways – usually without us even realising.

During the continuing covid-19 pandemic, and stimulated by the growing concerns related to climate change on Earth, we have relied on satellite technology for communications, healthcare (including assistance for first responders), education, information and simple social interaction. The relevance of the space and satellite industry to our lives has rarely been greater.

The importance of *The Space Law Review* and its content written by experts across the world is growing each year as the value of the space domain and applications from space activities are understood to an enhanced level. New applications of satellite technology are brought into use and the commercial revenues from the industry are more widely recognised.

New and innovative technologies increasingly derive from private commercial activities rather than more traditional government-funded missions. States are liable and responsible for national activities in outer space and, therefore, seek to supervise and authorise such activities through national legislation and licensing mechanisms, which we see more of across the globe. New and more diverse space players are entering the market, including more state players.

New technology – such as constellations of several thousands of satellites (even hundreds of thousands), very high-resolution Earth observation data and new small-launcher technology – is testing regulatory and insurance frameworks. This, combined with greater risks from debris, in-orbit servicing, active debris removal and robotic missions, presents challenges to regulators that must work closely with industry to govern such activities, ideally by using anticipatory and outcome-focused regulation.

The dynamics of space are also changing with aspiring space nations joining the international space community, along with new categories of non-state actors, such as large industrial players, start-ups and universities. Space is mainstream now and part of everyone’s lives.

Lawyers, such as the excellent contributors to this book, are not only required to understand the international treaties and how they are enforced and applied in national law,

but are also being asked to look at the application of such laws, regulations and policies in innovative and challenging ways and at new applications, technologies (civil and military) and new business models.

Space law is not simply one practice area – it consists of layers of interrelated disciplines and dimensions that lawyers must apply and be alert to, such as: telecommunications; Earth observation; navigation; security and defence; data management; international relations; radio frequency spectrum; technology; national, regional and international laws and regulations; export controls; environmental laws; and corporate, finance and taxation. It requires bright, flexible, problem-solving and solutions-driven minds.

This year I am very pleased to say that *The Space Law Review* has expanded to include contributions from Lichtenberger Partner Attorneys-at-Law in Austria, Fasken Martineau DuMoulin LLP in Canada, Bird & Bird in France, the International Institute of Air and Space Law in the Netherlands and Formichella & Sritawat Attorneys at Law in Thailand. It has been a pleasure to engage with these new contributors, who have all shared their expertise and knowledge in this book.

My thanks go to all the authors, who have contributed their time, expertise and enthusiasm to this edition. Their practical knowledge of the legal and regulatory frameworks, and the related challenges and solutions, makes this book unique.

The contributors' expertise will grow in importance as the economic benefits from the space sector are increasingly recognised by states. The global space economy is expected to be worth £40 billion by 2030.

Effective national regulation, enabling innovation and investment, is an increasingly important source of competitive advantage globally. We are witnessing increasing regulatory forum shopping in the space industry. The importance of effective national regulation as an enabler for new and innovative satellite technology and the ability to raise finance is increasingly recognised. This is especially the case when such national regulation embraces sustainability goals in relation to the mitigation of space debris and the protection of the outer space environment.

Thank you again to the contributors of *The Space Law Review*. I wish them success in the year ahead. I hope that readers find this edition valuable and recognise the benefit that the international space industry can bring us, especially during challenging times.

Joanne Wheeler MBE

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PORTUGAL

Magda Cocco, Helena Correia Mendonça and Cristina Melo Miranda¹

I INTRODUCTION TO THE NATIONAL LEGAL, REGULATORY AND POLICY FRAMEWORK

Portugal has been taking important steps in the space sector in recent years. In addition to the approval of its space strategy in 2018 (Portugal Space 2030), Portugal also became part of the European Space Surveillance and Tracking programme (EUSST); launched the Atlantic International Research Centre (the AIR Centre); stated its intention to set up a spaceport in the Azores; and approved its own National Space Act and the Azores Regional Space Act. Moreover, it reinforced its contribution to the European Space Agency (ESA), appointed a national space authority (the Space Authority) and set up a space agency (Portugal Space). In 2020, it set in motion a series of innovative space projects that promise to bring Portugal to the forefront of the space sector.

i Portugal Space 2030

Resolution of the Council of Ministers No. 30/2018 of 12 March 2018 approved Portugal Space 2030. Its strategic goals include:

- a* promoting economic growth and the creation of skilled employment through space-related markets;
- b* promoting the generation of satellite data through new space technologies and infrastructures;
- c* contributing to the development of Portugal and international scientific cooperation, taking into consideration the geostrategic positioning of Portugal; and
- d* guaranteeing the development and evolution of legal, financial, institutional, and cultural and educational frameworks aimed at developing the space sector in Portugal.

The 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. In this respect, the strategy refers to the need to bring the space sector and other sectors together, and to find the means of exploring multiple data sources (big data). The integration of communication networks (including 5G), energy networks and mobility infrastructures, and the development of autonomous cars, drones, smart agriculture and the internet of things, are referred to as elements that will promote space technologies and services. The second axis relates to the development, construction and operation of space equipment, systems, infrastructures and

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services for space data generation, with an emphasis on mini-, micro- and nanosatellites. As part of the second axis, the development of a programme for access to space is mentioned, which has the following goals, among others: decreasing the costs of access to space through innovative launching technologies, which are also environmentally sound and promote the growth of small satellites; developing the next generation of satellites; and implementing constellations of satellites in areas such as Earth observation (EO), satellite navigation and satcom. This axis also makes reference to Portugal's participation in the EUSST. The third axis focuses on the development of national capability and skills in the space sector through scientific research, innovation, education and scientific culture. In this area, reference is made to increasing Portugal's participation in ESA and EU programmes, as well as reinforcing the cooperation of the Portuguese scientific community with international partners and industry.

To achieve the three axes, the strategy sets out a framework of five courses of action: (1) legal; (2) financial; (3) institutional; (4) internationalisation; and (5) scientific culture. The first aims to create a competitive space law. The second addresses the investment strategy for the sector. The third indicates that the institutional framework will cover a regulatory entity for licensing space activities, and a promoting agent – Portugal Space. The fourth covers the AIR Centre initiative and makes reference to cooperation and international partnerships with other countries. Finally, the fifth aims to develop education and scientific culture in the space sector, as well as facilitating access to information about space by the public. The development of a specialised consortium in the space sector in the form of a collaborative laboratory and continuing to promote the incubation of new companies in close cooperation with ESA (e.g., through the ESA Business Incubation Centre in Portugal) are also referred to.

In September 2020, a document titled “Portugal Space Strategy 2020-2030”: Current Implementation Status and a Guide for the Future’ was published. Among other items, it points to four programmatic challenges:

- a* establish, maintain and guarantee the operation of an ‘Atlantic constellation’, through international cooperation and under the coordination of the AIR Centre, before 2025;
- b* build, promote and operate a downstream digital platform, ‘Digital Planet’, capable of integrating multiple sources of data, including space, and extract information by making use of advanced digital technologies, such as artificial intelligence, to be put at the service of entities (public and private) across the country;
- c* develop a 5G ecosystem for the development of the Atlantic and innermost regions of Portugal; and
- d* establish a space innovation ecosystem, specifically on the island of Santa Maria in the Azores, which may include the Azores International Satellite Launch Programme (ISLP) (see Section I.iv), a landing facility for the ESA Space Rider and a teleport to attract institutional and commercial customers.

The core institutional framework for space in Portugal comprises the Space Authority, which is tasked with supervising and licensing space activities, and Portugal Space. The Space Authority is, provisionally, the National Communications Authority (ANACOM), which is also the competent entity for the assignment of orbital slots and frequencies.

Following the increasing relevance of outer space in defence, Portugal has also created a working group for a Space Defence Programme (PRESDEF) under Order No. 3732/2020 of 26 March 2020, which was tasked with: (1) developing a proposal for a National Defence Strategy for Space, including an action plan for its implementation and its governance

structure; and (2) identifying the guidelines for the development of the PRESDEF. It also created a committee for monitoring the PRESDEF under Order No. 1768/2021 of 17 February 2021, which is tasked with overseeing the execution of the implementation plan of the National Defence Strategy for Space, and with following up on the development of cooperative projects in the space domain, notably within the scope of the Permanent Structured Cooperation and the European Defence Fund.

The National Defence Strategy for Space 2020–2030 was presented in October 2021. It contains a set of strategic goals and axes, including the following: the development of capacities in the space domain; broadening access to space, and related technologies and services; promoting and integrating research, development and innovation in the space domain; and setting up a governance structure that articulates the national defence structures with Portugal Space and other relevant bodies. It also highlights the role of defence in the development of the goals of Portugal Space 2030.

In addition, the autonomous region of the Azores presented its Space Strategy in November 2021. The Strategy aims to enhance the national and European space goals, taking into consideration the specificities of the Azores region, notably its geostrategic location. In accordance with the information provided, the Strategy will be open for comments until the end of 2021.

ii Portugal Space

Portugal Space was set up in March 2019 under Resolution of the Council of Ministers No. 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 Portugal Space as an observer, intending to become a full member in the near future. Portugal Space may integrate other public entities whose activity is related to its purposes. It is the entity responsible for executing Portugal Space 2030 and is tasked with developing the national space sector. All national programmes relating to space are integrated within the agency, and they shall be executed in close connection with the national space surveillance and tracking (SST) programme. It also serves as an ESA Hub.

The participation of Portugal in the EUSST is addressed in Resolution of the Council of Ministers No. 116/2017 of 24 August 2017, which created, under the Ministry of Defence, a temporary body called the Space Surveillance and Tracking Project Group (GPSST). The GPSST was tasked with preparing and implementing national SST capabilities, as well as preparing the national application for the EUSST. The GPSST was further tasked with approving the general terms of the governance model for the national SST programme and was the designated national entity in the EUSST consortium. The Portuguese application to the EUSST was approved in mid-2018 by the European Commission. The GPSST was originally set up for one year, but Resolution of the Council of Ministers No. 113/2018 of 31 August 2018 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 is the designated national entity in the EUSST) and will continue to do so until a new governance model is defined. In May 2021, the national Centre of Space Operations, which processes SST data, was inaugurated in the Azores.

iii AIR Centre

The AIR Centre is an international network research and innovation organisation tasked with implementing the Atlantic Interactions intergovernmental initiative, which aims to explore the Atlantic region (the Atlantic) in a sustainable way. In July 2017, the White Paper 'Atlantic Interactions' established an integrative approach to outer space, climate, energy and ocean science in the Atlantic, together with emerging methods of data science management. With regard to outer space, the White Paper stresses the importance of space systems and applications. Among other things, it highlights:

- a* the use of mega constellations and small satellites to closely study and monitor the ocean and the atmosphere;
- b* the importance of fostering affordable access to space, especially with regard to the launch of small satellites to collect information on the Atlantic;
- c* the use of space data to improve safety in the Atlantic; and
- d* the use of the Atlantic islands for the implementation of ground facilities for SST.

Following the issuance of the White Paper, several Declarations have been signed under High-Level Industry-Science-Government Dialogues, which have been held in several countries. Under the Florionópolis Declaration, which was signed in November 2017, it was agreed that the AIR Centre should be established as an intergovernmental organisation with headquarters in the Azores and with a network of centres in the Atlantic. The Association for the Development of the AIR Centre was legally formed in April 2018 as a non-profit association, and Resolution of the Council of Ministers No. 29/2018 of 12 March 2018, among other things, tasks the Ministry of Science, Technology and Higher Education, through the Foundation for Science and Technology, to launch initiatives and support national programmes related to the Atlantic. At the time of writing, the AIR Centre has offices in Brazil, Nigeria, Spain, the United Kingdom and the United States, and nodes spread throughout the Atlantic (in Angola, Brazil, Cape Verde, Ghana, Namibia, Portugal, São Tomé and Príncipe, South Africa and the United States). Several research and technology organisations are also a part of the initiative. In addition to other initiatives implemented through the AIR Centre, an EO lab was established as ESALab@Azores, focused on EO-related systems and maritime surveillance. The lab has been fully operational since September 2019.

iv Azores International Satellite Launch Programme

The ISLP was the national initiative for the establishment of a spaceport in the Azores. The ISLP aimed to install an open spaceport whereby more than one type of launcher could be launched from the port. The purpose was to guarantee low-cost, frequent and regular access to space for small satellites. Under the ISLP, companies were called upon to submit expressions of interest (with a deadline of 31 October 2018). A total of 14 were submitted. In accordance with information provided by the Ministry of Science, Technology and Higher Education, interested companies included ArianeGroup, Virgin Orbit, Roscosmos, Sierra Nevada, Rocket Factory Augsburg, Elecnor Deimos, Avio and PLD Space. In total, the expressions of interest included 11 companies from the European Union, two from the United States and one from Russia. The purpose of this international call for interest was to encourage and invite enterprises and public organisations from around the world to collaborate with Portuguese enterprises and research laboratories to design, install and operate a spaceport in the Azores.

A formal open tender was launched in March 2019 for the construction, operation and exploitation of the spaceport² and two final proposals were submitted by a consortium led by Rocket Factory Augsburg and Edisoft, and by the Atlantic Spaceport Consortium, comprising ILEX Space and Optimal Structural Solutions. At the beginning of 2021, it was stated that launches from the port would start from 2023. However, the tender was not awarded as both proposals were excluded for not meeting all the required criteria, leading the regional government of the Azores to indicate that the project would be revised and updated. No dates for the launch of the new project are publicly available at the time of writing, even though the regional government of the Azores has publicly indicated its continued commitment to implementing a spaceport in the Azores as soon as possible.

v Legal framework

The National Space Act was approved by Decree-Law No. 16/2019 of 22 January 2019. The Act sets out a number of provisions and measures aimed at facilitating and encouraging private space activity in Portugal. The Azores has also enacted the Azores Regional Space Act (approved by Regional Legislative Decree No. 9/2019/A), which regulates space activities taking place in the Azores and establishes the economic and financial regime for these activities. In addition, the Space Authority also issued the Regulation on Access to and Exercise of Space Activities (Regulation No. 697/2019) (the Space Authority Regulation), which sets out the procedures for obtaining licences and pre-qualifications, as well as for registering space objects and for transferring ownership of space objects. The Azores also issued Regional Implementing Decree 6/2020/A, which approved the Regulation of Licensing of Space Activities in the Autonomous Region of the Azores (the Azores Space Regulation).

vi International regimes

Portugal became a party to the United Nations' Convention on Registration of Objects Launched into Outer Space (the Registration Convention)³ in 2018 and the Convention on International Liability for Damage Caused by Space Objects in 2019.⁴ It had previously acceded to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies 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.

2 The tender for construction, operation and exploitation of a spaceport enabling a new generation of launch services, located on the island of Santa Maria, Azores (Procedure Announcement No. 3074/2019 as published in the national Official Journal).

3 By means of Decree 24/2018 of 4 October. The Convention became binding for Portugal on 2 November 2018, in accordance with Notice No. 143/2018 of 28 November 2018.

4 By means of Decree 14/2019 of 16 April 2019.

II REGULATION IN PRACTICE

i National Space Act

The National Space Act sets out the national framework for accessing and performing space activities, which include space operations and launch-site operations. Space operations comprise the following.

- a* Launch and return operations: the activity whereby space objects are intended to be sent or launched into space, notably to be placed in or beyond orbit, and then returned to the Earth's surface. The launch and return operator performs launch and return operations.
- b* Command and control operations: the activity consisting of exercising effective control over a space object. The command and control operator performs command and control operations of space objects in outer space, whether temporarily or in transit. Where the space object cannot be controlled or guided, the command and control operator will be deemed the natural or corporate person who hired the launch or exploits the space object, as notified to the Space Authority.

Launch-site operations relate to the management, administration or direction of a launch site, the definition of which includes facilities intended for the return of space objects. The launch site operator manages, administers and directs a launch site.

The National Space Act applies to space activities performed both in the national territory irrespective of the nationality of the operator and outside the national territory by Portuguese operators or operators established in the national territory.

Space activities are subject to (1) a mandatory licence for launch or return operations and command and control operations, and (2) registration of space objects. The National Space Act further created a voluntary pre-qualification system. Under this system, operators, systems, processes, and features and specifications can be certified in a set of elements, which may include the technical, economic and financial capacity of operators, the compliance of systems and processes with applicable laws and regulations, and the features and specifications of space objects. Pre-qualification aims at streamlining the licensing procedure by waiving the need to submit the information set out in the pre-qualification certificate in the licensing procedure.

There are two types of licence: the individual licence, which is applicable to each type of space operation; and the blanket licence, which is applicable to a series of space operations of the same type. In addition, there are joint licences, which are those applicable to space operations of the same type or a different type that comprise one or more launch or return operations and the corresponding operations of command and control of space objects launched, even if performed by more than one operator. Under the joint licensing procedure, the same or different types of space operations may, even if carried out by more than one operator, be licensed to a single operator for itself and on behalf of other operators.

The licences are granted if the Space Authority is satisfied that a set of conditions have been met, including:

- a* the applicant has the technical, economic and financial capacity for the space operations it intends to carry out;
- b* the space operation duly safeguards damage to the Earth's surface, airspace and outer space, in accordance with applicable national and international commitments;
- c* the space operation ensures the minimisation of space debris as much as possible, in accordance with international principles and commitments;

- d* the space operation is compatible with applicable public security provisions, including on public health and citizens' physical safety;
- e* the space operation does not jeopardise domestic security or the strategic interests of Portugal, nor does it breach Portugal's international commitments;
- f* all other authorisations and certificates required for the purpose of the space operation have been issued by the relevant entities; and
- g* the applicant carries mandatory civil liability insurance as required under the National Space Act.

In addition, the licence may stipulate other requirements, including in connection with environmental matters.

The decision to grant or withhold the licence must be issued by the Space Authority within 90 days of receipt of a complete application. The National Space Act also provides that a special licensing framework, which may consist of shorter deadlines or streamlined procedures, may be defined by the Space Authority for certain circumstances, such as: (1) if the applicant is a public entity or an international organisation acting under international agreements concluded with Portugal; or (2) if the intended space operation is performed exclusively for scientific, research and development (R&D), educational or training purposes, or consists of activities with experimental purposes with demonstrable low risk for the Earth's surface, airspace and outer space, including for public health and citizens' physical safety.

The National 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 commitments. Secondly, space operations performed abroad but subject to the National Space Act 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 commitments.

In relation to registration, the National 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 National Space Act also provides that the following must be registered with the Space Authority:

- a* space objects whose launch, return or command and control are performed by operators licensed in Portugal;
- b* the transfer of ownership of any space objects whose launch, return or command and control is carried out by operators licensed under the National Space Act;
- c* the end of the useful life of a space object operated and controlled by a command and control operator licensed in Portugal; and
- d* any incident or serious accident suffered by the space object.

As regards liability, the National Space Act indicates that operators are liable for damage caused in the performance of the space activity, as follows: (1) strict liability for damage caused by the space object to the surface of the Earth or aircraft in flight; and (2) liability in the event of fault for damage falling outside the scope of point (1). There is also a mechanism of redress by means of which, if Portugal is held liable, pursuant to its international commitments, for any

damage caused by a space object, the state has a right of recourse against the operator that, under the National Space Act, is responsible for that space object. The right of redress will be capped at the amounts to be defined by an order of the members of government responsible for finance, science and technology. However, the cap will not apply in certain circumstances, 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.

Licensed operators are obligated to take out civil liability insurance, with minimum capital to be defined by an order of the members of government responsible for finance, science and technology, and the sea, which may also regulate other minimum requirements for the insurance agreement. By means of this order, the insurance obligation may also be waived or the insured amount reduced in the following circumstances:

- a* operations of launch, return, and command and control of space objects of small dimensions, as defined by the Space Authority;
- b* space operations conducted exclusively for scientific, R&D, or educational and training purposes;
- c* if the operator submits another financial guarantee as permitted under the order and this is accepted by the Space Authority; and
- d* operations that demonstrably entail reduced risks, as defined by the Space Authority.

The National Space Act contains a set of provisions for incident and accident reporting, which also include the obligation to notify 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. Operators are also 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 the 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.

In addition to its powers relating to licensing, registration, pre-qualification, supervision and inspection, the Space Authority is tasked with assessing and deciding on requests or claims by the operators and resolving disputes in connection with the obligations arising from the National Space Act, between entities subject to these obligations, and without prejudice to the possibility of resorting to courts. The Space Authority is also tasked with initiating and dealing with administrative offence proceedings and applying the penalties. In this respect, infringements of the Act are administrative offences that may lead to the application of penalties of between €250 and €44,891.81, depending on whether the operator is a natural or 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.

Three additional points are worth mentioning. First, the National Space Act contains provisions on the transfer of a licence and on the transfer of ownership of space objects. The first is subject to authorisation by the Space Authority (which shall only be approved if all legal requirements for its issue are met), and the second is subject to notification to the Space Authority.

Secondly, there are regulations and orders that complement the National Space Act. These include (1) the regulation by the Space Authority for licensing, registration,

pre-qualification and transfer of ownership of space objects, and (2) orders on liability (for caps) and insurance (minimum capital and other minimum requirements, waiver and reduction of insured amounts as permitted by the Act).

The Space Authority Regulation was approved in July 2019. The Regulation aims to create simple and effective procedures with a view to promoting private activity. However, some points may create challenges, such as the following.

- a* The Regulation does not create a special licensing procedure for the cases foreseen in the National Space Act, but instead establishes that it is the applicant that must require a simplified procedure, and the Space Authority, within 10 days, must communicate the ad hoc specific procedures to be followed. This could create uncertainty for the industry regarding the licensing requirements and process to be taken.
- b* The Regulation does not seem to be fully aligned with the National Space Act regarding who can obtain a launch licence (as it seems to limit this licence to the launch operator, while the National Space Act extends it to whoever intends to launch a space object, thus also covering payloads). This may raise doubts as to the types of licences operators must obtain.
- c* The Regulation seems to limit the possibilities of joint licences for different types of operations, thus preventing these licences from being used for operations of the same type performed by different operators – an option expressly envisaged by the National Space Act.
- d* The Regulation requires a level of information from the applicant that may be too burdensome, especially detailed information relating to the spaceport from which a space object will be launched.

In relation to liability and insurance, Portugal Space launched a public consultation on the insurance framework for Portugal and the right of recourse by the state in July 2020. In accordance with its terms of reference (TOR), it was proposed that the insurance would be the lowest value among the following: €50 million or the amount determined by the insurer in accordance with the calculation of the maximum probable loss from the operation – with the insurance having to cover the launch or return operation (or both), the command and control operation and risks in orbit, thus requiring the insurance to have an annual renewal until the end of the satellite’s useful life (with each renewal having to be reported to the Space Authority). Instead of insurance, a bank guarantee or unequivocal proof of assets available in an amount equivalent to the value that would be applicable to the space operation can be accepted as a guarantee. For the cap on the right of recourse, and in accordance with the TOR, €50 million is also proposed, as it is the amount indicated in the minimum insurance coverage. At the time of writing, no further news on this topic has been made publicly available.

The National Space Act also addresses the economic and financial regime applicable to space activities by indicating that it shall promote the economic and financial sustainability of the activities carried out by the Space Authority, notably by means of the collection of fees and levies from the companies and other entities subject to its supervisory powers.

Lastly, the National Space Act establishes that the procedures for the licence, pre-qualification, registration and transfer of space objects in connection with activities to be developed in the autonomous regions of the Azores and Madeira, and the corresponding economic and financial framework, are to be established by means of a regional legislative decree.

ii Azores Regional Space Act and Space Regulation

As mentioned in Section I.v, the Azores Regional Space Act was enacted in 2019 and contains the legal framework for 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). The Azores Regional Space Act duplicates the provisions of the National Space Act, with some new features. The Act:

- a creates a regional space authority (EER) responsible for the licensing, pre-qualification, registration and transfer of space objects, and the supervision of space activities in the Azores;
- b indicates that the procedures for licensing, pre-qualification, registration and transfer of space objects are subject to the prior technical review of the Space Authority;
- c indicates that the EER must communicate to the Space Authority all required information so that the Space Authority can comply with the applicable international obligations (especially those relating to registration of space objects);
- d clarifies that the EER and the Space Authority shall cooperate in the above procedures, as well as in the supervision of space activities; and
- e introduces a fee for the use of space, the legal framework of which is unclear and has no parallel in other jurisdictions.

By replicating the conditions of the National Space Act and creating the EER, the Azores Regional Space Act may lead to the duplication of processes that private operators will have to comply with for pursuing space activities in the Azores. For instance, it seems that operators will have to obtain two licences: one from the Space Authority and one from the EER. In addition, it seems that the breach of either Act will lead to fines, meaning that operators may be subject to fines twice. However, despite duplicating most of the provisions of the National Space Act, the Azores Regional Space Act has placed some wordings in a different section or drafted it in a manner closer to previous versions of the National Space Act (which may indicate that the Azores Regional Space Act was based on an old version of the National Space Bill), which further complicates the coordination and interpretation of the Azores Regional Space Act in relation to the National Space Act.

On 22 July 2021, Regional Legislative Decree No. 24/2021/A amended the Azores Regional Space Act by establishing that the use of infrastructure and platforms situated on Azores land or in its sea space, which integrate the development of space activities in the region, is exercised exclusively by an administrative concession contract to be concluded with the regional government of the Azores. This raises questions of whether the new decree is compatible with both the National Space Act and the Azores Regional Space Act. Indeed, it seems that an entity seeking to engage in space activities through infrastructure and platforms located in the Azores will have to obtain a concession contract, in addition to licensing for the performance of space activities as provided for in both Acts. The new wording seems to require a concession contract for the 'use' of infrastructures and platforms in the performance of space activities (such as launches), and not only for their construction or operation.

The Azores Regional Space Act also indicates that regional regulations will be approved for the procedures to license, pre-qualify, register and transfer space objects. In this regard, the Azores Space Regulation was issued on 17 February 2020. The Regulation is similar to the Space Authority Regulation, although some differences can be identified, such as in relation to the level of information to be provided, which can be considered more market-friendly

than the corresponding national Regulation. However, the Azores Space Regulation does not expressly address coordination issues with the Space Authority, except in relation to pre-qualification, by indicating that requirements for pre-qualification delivered to the Space Authority but relating to space activities to be performed in the Azores shall be analysed and issued by the EER.

The Azores Regional Space Act also indicates that a regional order will be approved in relation to insurance, which may further lead to incompatibilities or duplicated obligations, given that a national order on insurance under the National Space Act is also envisaged. The regional order has not been approved at the time of writing.

From a strictly legal perspective, the National Space Act only indicates that the procedures for the licensing of space activities, and the pre-qualification, registration and transfer of space objects, in connection with activities to be developed in the autonomous regions of the Azores and Madeira, are to be defined by a regional legislative decree. However, the Azores Regional Space Act appears, in practice, to replicate the national regime.

III DISTINCTIVE CHARACTERISTICS OF THE NATIONAL FRAMEWORK

The Portuguese space framework contains a set of distinctive features resulting from the National Space Act and the approach taken with regard to the future spaceport of the Azores.

The National Space Act does not cover the operation of spaceports except for the purposes of pre-qualification (and supervision). This means that the licensing regime applies only to the launch, operation and return of space objects and not to terrestrial activities consisting of building and operating a spaceport. Hence, instead of a licensing regime whereby any stakeholder could install a spaceport in the country provided that certain requirements are met, the approach has been to select a general location (currently, the island of Santa Maria in the Azores) and open that location to a public tender for the selection of an operator.

Another distinctive characteristic is that the National Space Act indicates that the procedures for licensing, pre-qualification, registration and transfer of space objects relating to activities taking place in the Azores and Madeira will be defined by a regional legislative decree. This is especially important for operators that intend to carry out space operations in the future Azores spaceport, because the Azores has already enacted the Azores Regional Space Act.

It is clear that there are several points in the Azores Regional Space Act that must be harmonised with the National Space Act. In turn, certain procedures in both Acts must be harmonised with the procedure for the spaceport, to avoid differing, incompatible or burdensome obligations for operators. The exact details of how this coordination will be achieved are yet to be determined, as they depend upon the approval of the regional regulations by the Azores and the practical approach that the Space Authority and the EER will take in their relationship.

The National Space Act contains a number of innovative solutions aimed at encouraging private activity in Portugal, which are outlined below.

- a* In addition to an individual licence for each space operation, an operator can obtain a blanket licence covering a set of operations, which will facilitate the launching of constellations of satellites. A joint licence for several space operations, even if performed by different operators, can also be obtained, which will simplify the licensing of related space operations.

- b* A simplified licensing procedure may be implemented in certain situations, as indicated above, such as for operations that are carried out exclusively for scientific, R&D, educational or training purposes, or for experimental operations with low risk.
- c* In the event of space operations carried out by Portuguese nationals abroad, the requirement for a licence can be waived provided that certain other requirements are met. In addition, if the operator obtained a licence abroad, it may also obtain the Portuguese licence under a simplified licensing procedure.
- d* A pre-qualification regime has been created to expedite the licensing process, removing the need to resubmit the same information for future licences.
- e* A liability cap favouring operators in cases where Portugal is internationally liable for space activities has also been established. At the time of writing, the amount of the cap is yet to be established by order, in line with the public consultation that took place in 2020.
- f* There is mandatory civil liability insurance, but the insurance may be waived or the insured amount reduced in certain cases, such as for small satellites, space operations carried out exclusively for scientific, R&D, educational or training purposes, or operations with low risk. Insurance may also be waived or reduced if the operator submits another financial guarantee as permitted by the future order and if accepted by the Space Authority.
- g* Breach of the Act carries fines only, which cannot exceed €44,891.81. Ancillary sanctions prohibiting the carrying out of space activities or suspension of licences are established for certain cases.

The Space Authority is a one-stop shop, meaning that it may also assume responsibility for communicating with all other competent authorities whose authorisation may be required for a space operation, thus avoiding the need for operators to deal directly with the authorities.

To ensure that the solutions listed above are effective, careful coordination with the Azores Regional Space Act is required. This Act duplicates the conditions for licensing, pre-qualification, registration and transfer of space objects and may, as a result, create unexpected burdens for operators. Clarification of the procedures established in the Space Authority Regulation and the harmonisation of these procedures with the National Space Act may also have to be evaluated to guarantee a clear, simple and predictable legal framework.

IV CURRENT DEVELOPMENTS

Portugal has been active in recent years when it comes to space activities, as indicated in this chapter. The National Space Act and the Azores Regional Space Act have been enacted, with the National Space Act having been drafted with due attention to the need to respond to the advent of small satellites and constellations of satellites. However, at the time of writing, the complete framework is still under construction: notably, the orders on liability and insurance need to be approved, and the fees for licences have not yet been determined.

Portugal Space has been active in the development of the sector in the country, including through the Lighthouse Projects, which cover, among other things, the Blue Worlds strategy under ESA's Blue Worlds Task Force and focus on the maritime territory; new markets for nano- and microsatellites, including the development of a private-sector-driven EO constellation of small satellites and associated downstream applications focused on the socio-economic development of the Atlantic and other bodies of water; and, as mentioned in

Section I.i, a set of projects for the island of Santa Maria in the Azores, including a spaceport, a landing facility for the ESA Space Rider, a teleport (operational since 2020), test facilities for engines and a business incubator.

The development of the Atlantic constellation of microsatellites is also being devised, together with the development of the EO data platform Digital Planet. Other relevant projects include: ADRIOS, the first active debris removal and in-orbit service worldwide (Portugal will participate through the development of its guidance, navigation and control subsystem); Viriato, a reusable suborbital vehicle to foster research in orbital technologies; Caravela, which consists of a set of building blocks for micro-launchers; AEROS, a nanosatellite platform, which is a precursor to a future constellation to leverage scientific and economic synergy between space and the ocean; and Infante, which aims to deploy a constellation of small satellites for maritime surveillance, EO, and communications between satellites and ground stations.

Additionally, and importantly, two EO satellites (Deimos-1 and Deimos-2) were acquired by GeoSat in 2021. As a result, GeoSat has become one of the biggest satellite operators in Europe and the first Portuguese company to own and operate EO satellites.

A new 15-metre antenna was installed in the Santa Maria teleport in 2021 for Sun observation, and LeoLabs is installing two space radars for monitoring space debris. Additionally, in 2021, Portuguese entity CEiA signed a partnership with Rocket Factory Portugal for the production of launching systems in Portugal.

Finally, Portugal ratified the Square Kilometre Array Observatory Convention on 12 March 2019, joining the Netherlands, Italy, South Africa and Australia as founding members. Resolution No. 1/2021, approving the Convention, was published on 15 January 2021.

V OUTLOOK AND CONCLUSIONS

The National Space Act contains a set of innovative solutions for Portuguese and foreign operators in the country. Together with Portugal Space 2030 and the projects that are currently underway, it is paving the way for increasing space activities and furthering the development of the private sector and of R&D in Portugal. The increasing contributions to ESA, as well as the strengthening of international cooperation (including with the European Maritime Safety Agency and the EU Agency for the Space Programme), as indicated in Portugal Space 2030, are also relevant incentives for encouraging space activities in Portugal.

The Portuguese market will greatly benefit from these investments and innovations. In this respect, in accordance with information provided by Portugal Space at the end of 2019 in preparation for its participation in the ESA Ministerial Council 'Space19+', Portugal set the target of attracting investment of €2.5 billion for 2020–2030 and increasing the overall level of investment in space in Portugal by a factor of 10, including:

- a* increasing the 'annual outcome' of space-related activities in Portugal to approximately €500 million;
- b* creating and promoting approximately 1,000 skilled jobs in Portugal;
- c* attracting major players to operate in Portugal and supporting new entrepreneurial projects to help develop new high-added-value activities; and
- d* strengthening space research in close cooperation with academia, scientists, the public administration and, most importantly, the business sector, and developing new skills and advanced training of qualified human resources.

The implementation plan defines a focus on EO, space safety, space transportation and telecommunications, including related downstream activities for each field.

Notably, the level of public investment more than doubled in the past four years, from €25 million in 2016 to an estimated €52 million in 2021.

The possibility of a framework for EO data, space mining, human space flight and suborbital flights has not been discussed (the National Space Act can be interpreted to include suborbital flights of space objects – although this view may require clarification from the Space Authority). However, the expected growth in space activities and the increased visibility the current initiatives will inevitably bring to the country may lead to greater awareness in these areas and contribute to the approval of relevant regimes. The clear investment in EO may well lead to a legal framework in this area in the short to medium term. The work of both the Space Authority and Portugal Space will naturally continue to play an important role in clarifying, detailing and encouraging initiatives and activities in the sector.

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