Brazilian National Law in Space: How Important is It?

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Abstract

This paper analyzes Brazilian space legislation to identify its effectiveness and proposes a minimum regulatory instrument to support and promote national space initiatives. The Brazilian government has had budgetary difficulties, but as the interest of the private sector grows and a "New Space" scenario opens, its space program needs to adapt, reaching for industry, academia, and government institutions to foster the global space economy's inclusive and sustainable growth. Like most Latin American countries, Brazil does not have an inspiring and secure legal framework for commercial space activities. Authorization, supervision, registration and compensation are examples of necessary regulatory standards. Other issues, like remote sensing and mitigation of space debris, also deserve proper legal treatment. A general law on space containing basic provisions for legal stability is necessary to encourage private activities. A trustworthy legal framework will help boost local and foreign investment for the development of the Brazilian space program.

Acronyms/Abbreviations

Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (ARRA)
Brazilian Air and Space Law Association (SBDA)
Brazilian Space Agency (AEB)
Brazilian Space Program Development Committee (CDPEB)
China-Brazil Earth Resources Satellite (CBERS)
Convention on International Liability for Damage Caused by Space Objects (LIAB)
Convention on Registration of Objects Launched into Outer Space (REG)

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Acknowledgements: The authors thank their affiliate institutions, the National Institute for Space Research, the Government of Brazil and the Catholic University of Santos.

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Institute of Aeronautics and Space (IAE)
International Space Exploration Coordination Group (ISECG)
Ministry of Defense (MD)
Ministry of Science, Technology, and Innovations (MCTI)
National Development Policy of Space Activities (PNDAE)
National Institute for Space Research (INPE)
National Program of Space Activities (PNAE)
National System for the Development of Space Activities (SINDAE)
Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (OST)

1. Introduction

This paper intends to analyze the Brazilian space legislation to identify its effectiveness and propose measures that support current and future national space initiatives.

Space law is an autonomous and independent branch of public law. In accordance with art. 22, I, of the Brazilian Federal Constitution, it is the exclusive responsibility of the Union to legislate on space law. Therefore, the Brazilian Magna Carta, very clearly, established an exclusive competence of the central entity of the federation to regulate the matter.

Brazil has a long-standing space program, which began in the early 1960s, during the space race waged between the two major world space powers at the time: the United States of America (USA) and the Union of Soviet Socialist Republics (USSR). Over the years, Brazil has established itself as an important player in the sector through several federal public organizations, like INPE, AEB, MCTI, DCTA and IAE, the latter two from MD. Thus, the country has consolidated the infrastructure for satellite integration and testing, which is among the best and largest laboratories in the world. It has also designed, built, and operated data collection and remote sensing satellites, designed and produced a set of sounding rockets, and advanced basic research in practically all areas of knowledge related to the space sector. Despite that, Brazil's national space legislation is scarce, and it lacks a general set of provisions to encompass the basic guidelines for space activities. Brazil is part of four of the UN Treaties: OST (1967); ARRA (1968); LIAB (1972) and REG (1974).

New space endeavors are calling for every State to revisit, or even to elaborate their space regulations. Some of such endeavors are very provocative since the matter has not found consensus in the international arena, e.g., space resources mining; suborbital flight operations; space traffic management; space tourism; cyber security etc.

The design of a new legislation must consider the legacy of guidelines and treaties that Brazil committed to support but also the new scenarios of the space sector. In the next topics some of these recent developments are presented and discussed.

2. Why Talk About a Brazilian Space Law?

The importance of a Brazilian Space Law finds its support in the emergence of new initiatives in which Brazil is part or is a potential participant.

2.1. Artemis Accords

On 15 June 2021, Brazil became the 12th nation to sign the Artemis Accords and the first in South America to do so. It joins Australia, Canada, Italy, Japan, Luxembourg, the Republic of Korea, New Zealand, the United Kingdom, the United Arab Emirates, Ukraine, and the United States in signing the document, which establishes a practical set of principles to guide space exploration cooperation among nations participating in NASA's 21st century lunar exploration plans.

What would be the impact of this decision on a future national space law? Is the current Brazilian legal regime enough to account for the consequences of our participation? For example, if the private sector is involved, how will the State be protected from potential liabilities or how will the financial health of companies be safeguarded?

2.2. ISECG

Since September 2020, AEB is part of ISECG, which is a forum set up by 26 space agencies to advance the Global Exploration Strategy through coordination of their mutual efforts in space exploration. Many of these space agencies have renewed their focus on the exploration of the Moon. In both corporations (ISECG and Artemis), the Brazilian participation is still not clear. In any case, wherever they may lead, law should follow.

2.3. The Private Space Sector

Governments are key to supporting the private space sector. Space activities are considered ultrahazardous and expensive. States can assist such sector by developing the necessary infrastructure, by financing research and development, by ensuring third-party liability compensation in case of damage for certain types of entrepreneurships, by providing a clear and fair pathway for licensing. Nevertheless, for the private sector to develop safely it requires coherent legislation. The more bureaucratic the path is, the more difficult it is to innovate. Due to the miniaturization of satellites, for instance, the manufacturing and even lifetime of some missions might be incompatible with long licensing procedures

According to Euroconsult's Government Space Programs 2019 report, global government space budgets totaled around seventy billion dollars in 2018. This report states that Brazil spent only 122 million dollars, much less than Egypt, Turkey, Saudi Arabia, UAE and others.
Despite the lack of investments in the sector, it has accomplished to launch, from 2019 and 2021, one satellite in cooperation with China (CBERS-4A), one Earth Observation satellite (Amazonia-1), and two cubesats (FloripaSat and NanoSatCBr-2). Such performance demonstrates the willingness and competence of the country to innovate and cooperate in the space sector

2.4. Alcantara Space Port

Alcantara Space Port is in a strategic and very competitive position for Brazil, in comparison with the best spaceports locations worldwide. Close to the equator, some types of launch, such as those with a low inclination. This attribute could increase the satellite mass capacity between 13 and 31% compared to the same vehicle launched from other centers located in higher latitudes.[1]

3. Points to Consider on a New Legislation

3.1. Authorization

Article VI of OST (1967) says that states have the obligation to authorize and continuously supervise space activities conducted by their nationals.
Authorization, license, permit or certificate, whatever the name, are forms that national space legislation employs to allow private entities to conduct space activities.[2]
Currently, there is no comprehensive national space legislation in Brazil. However, Law No. 8.854 (1994) – The Act Establishing the Brazilian Space Agency (AEB) – says in its Article 3, XIII, that AEB has the power to establish norms and emit licenses and authorizations relative to space activities.
The AEB Ordinance No. 5 of February 21, 2002 was the first regulatory instrument concerning the authorization procedure for non-governmental launches from Brazilian territory. In May 28, 2020, AEB published Ordinance No. 182, which instituted more comprehensive procedures and requirements for the issue of operator licenses for space launch activities from the national territory.[3]

1 Força Aérea Brasileira (FAB), Operacionais, https://www2.fab.mil.br/cla/index.php/vantagens2, (accessed 20 August 2021).
2 A. Froehlich, V. Seffinga, National Space Legislation: A Comparative and Evaluative Analysis, Springer, Cham, 2018.
3 D. Messier, Brazilian Space Agency Evaluating 11 Proposals to Launch From Alcantara. 7 September 2020, http://www.parabolicarc.com/2020/09/07/brazilian-space-agency-evaluating-11-proposals-to-launch-from-alcantara/, (accessed 15 August 2021).

Later, this matter was regulated by Ordinance No. 698 of August 31, 2021, which revoked the previous ones.
Therefore, in this aspect, it can be stated that there is already a national legislation concerning authorization and supervision of commercial launches, and the future Brazilian general space law will only reproduce such a legal command.

3.2. Insurance

In 2012, the Space Law Committee of the International Law Association, during the entity's 75th Biennial Congress, held in Sofia, Bulgaria, proposed a model of national legislation to be adopted by countries that intend to adopt a national law about space. This model, of course, is not compulsory and is intended only to serve as a guide for States to use it as a draft law.
The rapporteur of the referred Committee was the professor at the University of Cologne, Germany, Stephan Hobe, who considers as indispensable elements of any future model of law: a) detailed duties and requirements for authorization and licensing procedures; b) State supervision duties; and c) mandatory insurance for private or commercial actors in the space sector.[4]
With the increasing privatization of space activities, it proved crucial to accurately determine the liability issues in these activities and ensure financially sustainable space projects. The activity in outer space represents, even today, a high-risk, or even catastrophic environment.
Therefore, effective insurance solutions are indispensable for developing an economically viable or even profitable activity in space. For this reason, it seems essential that Brazil provides for legal ways of, on the one hand, minimizing the possible economic damage to the Union (which ultimately is solely internationally responsible for the activities space), but also, on the other, to stimulate private activity and competition.[5]

3.3. Recourse and Liability

Article VI and VII of the OST (1967) already state that States are responsible for the space activities conducted by their nationals, weather they are governmental or non-governmental institutions, and also that the Launching State is liable for the damage caused to a third party by their space objects on the surface of the Earth or to an aircraft in flight (absolute liability) or in outer space (fault liability). With the increment of a diverse group of space actors, that encompasses private entities, universities, start-ups etc., a national space legislation shall foresee a recourse provision to ensure that, in case of damage, the Launching-State has guarantees to compensate the third-party losses. The term "Launching State", according to the LIAB (1972)

4 S. Hobe, Space Law. 1. ed. Oxford, Hart, (2019), 133.
5 M. Alvarenga dos Santos, P. de Souza, I. Grosner. A necessidade de uma lei geral do espaço no Brasil, Revista de Direito da UnB, v. 4. n. 3 (2020), 106-138.

refers to the State that launches, procures the launch, or from whose territory or facility the space object is launched. It is worth mentioning that more than one State can be jointly and severally liable.

3.4. Registration

In compliance with Article VIII of the OST (1967), as well as the ARRA (1974), when a space object is launched into outer space, the launching State must register it in a national registry, to be maintained by him. When there are two or more launching States, they must jointly decide which one of them will register the object, in accordance with Paragraph 1., Article II. of the Convention (1974). The contents of each registry and the conditions of its administration will be determined by the respective State of registry. In addition to the national registration, in accordance with Art. IV of the Convention on Registration (1974), the State of registry shall provide the Secretary-General of the United Nations with the following information about the space object under its registration: a) Name of the launching State or States; b) An appropriate designation of the space object or its registration number; c) Date and territory or place of launch; d) Basic orbital parameters, including: (i) Nodal period; (ii) Inclination; (iii) Apogee; and (iv) Perigee; and general function of the spatial object.

Thus, the Brazilian general law for space must organize the information that must be contained in the national registry and the competent authority that must keep the national registry updated and provide information and registry updates to the UN Secretary General. In Brazil, the matter has already been provisionally regulated by the AEB in the form of its own instruments, such as Resolution No. 69, of December 12, 2006, and Ordinance No. 96, of November 30, 2011. The registration State is always a single State, among the launching State(s) of a given space object. And it is this State of Registry that will retain jurisdiction and control of the object in question (OST, 1967, and REG, 1974). However, liability for damage caused by this space object will always rest with the launching State, whose status (launching State) is not waivable. Hence, the importance of regulating this activity.

3.5. Environmental Protection

The Brazilian Federal Constitution addresses a specific Chapter dealing with environmental protection. According to Article 225 "Everyone has the right to an ecologically balanced environment, which is an asset of common use and essential to a healthy quality of life, and both the Government and the community shall have the duty to defend and preserve it for present and future generations".[6]

6 Presidência da República, Constituição Federal da República Federativa do Brasil, 05 October 1988, http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm, (accessed 28.08.21).

In the Space Law Treaties, Article IX of the OST (1967) is the single reference to any environmental concern arising from space endeavors. It states that Parties to the Treaty shall conduct their activities in outer space, the Moon, and other celestial bodies in such manners as to avoid harmful contamination.
Brazil has long ago ratified the OST (1967) and, thus, as an international obligation (by the Treaty), the future Brazilian space law must address environmental protection in its provisions. That means that necessary environmental licenses should be part of the entire operation. That does not mean detailed requirements shall be addressed in the general law. The general law shall bring principles of environmental protection, for instance the precautionary, sustainable development, intergenerational equity principles. Specific procedures and requirements for authorization and licensing, which include environmental protection concerns, can be codified into rules to be issued by a national regulatory entity, following the example of the USA with its FAA.

3.6. Enforcement

A national space law will be vague if there are no mechanisms for supervision of the activities conducted by the State's nationals and enforcement of its legal provisions. As mentioned by J. Monserrat Filho, the basis of a national legislation is the duty of every State party to the OST (1967) to authorize and continuously supervise the space activities of its nationals (Article VI).[7] Therefore, sanctions and other types of penalties, like the loss of an authorization or license to operate, shall be anticipated. This is the remedy found by Australia, Belgium, China, South Korea, the Netherlands, among others:

> "To give their regulatory oversight teeth, many States impose enforcement mechanisms in their national space legislation. Sanctions such as license suspension or revocation, as well as fines and imprisonment, are important regulatory means to ensure compliance with regulatory obligations."[8]

4. National Space Legislations

There are many examples of national space laws: USA (1958); Norway (1969); Sweden (1982); UK (1986); Russia (1993); South Africa (1993); Ukraine (1996); Australia (1998); South Korea (2005); Belgium (2005); Netherlands (2007); France (2008); Japan (2008); Austria (2011); Indonesia

7 J Monserrat Filho, Rumo à Lei Geral das Atividades Espaciais no Brasil, 06 April 2013, https://www.defesanet.com.br/space/noticia/10369/Rumo-a-Lei-Geral-das-Atividades-Espaciais-no-Brasil/, (accessed 27.08.21).

8 P. S. Dempsey, National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement, 36 Nw. J. Int'l L.

(2013); Denmark (2016); Luxembourg (2016); New Zealand (2017); Finland (2017) and Portugal (2018).
As rightly put by A. Froehlich and V. Seffinga:

> "States generally want to enact national legislation so as to regulate activities in the manner they see most fit, to stimulate or discourage certain behavior or to safeguard their interests and the rights of their citizens."[9]

A clear motivation to enact national space legislation is to provide a competitive legislative framework to leverage private space activities so that companies feel comfortable and secure in developing their activities in the territory of the launching state.
D. Linden points to what he calls regulatory competition:

> "Regulatory, institutional, or rules-based competition occurs when states compete with each other, in their capacity as regulators, to attract resources and mobile factors of production (e.g., undertakings). It is one of the reasons that the form and content of domestic laws are not only the result of a natural and purely domestic evolution of their system."[10]

Although this is undeniably one of the reasons to enact national space legislation, we share the opinion of A. Froehlich and V. Seffinga that the primary motivation is to adhere to the international obligations that rest upon states, primarily which provides Articles VI, VII and VIII of the OST (1967) and their elaboration in the LIAB (1972) and the REG (1974).[11]

5. National Space Legislation on Space Mineral Resources

This topic of the recent exploitation agenda is also included in some national space laws, whose major objective is to allow the extraction of space resources. In particular: United States of America: US Commercial Space Launch Competitiveness Act (2015), Luxembourg: Law on the Exploration and Use of Space Resources (2017), Law on Space Activities (2020), United Arab Emirates: Federal Law on the Regulation of the Space Sector (2019), Japan: Space Resources Act (2021).
There is no doubt that those states enable the exploration and commercial use of space resources in their legal instruments.

9 A. Froehlich, V. Seffinga, National Space Legislation: A Comparative and Evaluative Analysis, Springer, Cham, 2018.
10 D. Linden, The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization, JSPG. Vol. 8, Issue 1, February (2016).
11 A. Froehlich, V. Seffinga, National Space Legislation: A Comparative and Evaluative Analysis, Springer, Cham, 2018.

In simple words, these laws give private operators assurances as to the ownership of the resources they extract in outer space.[12] It is expected that this will stimulate the creation and development of the "New Space" industry in their territories.[13]

6. The Status of the National Space Legislation in Brazil

As previously set forth, space law is an autonomous and independent branch of public law. In accordance with Article 22, I, of the Brazilian Federal Constitution, it is the exclusive responsibility of the Union to legislate on space law.

As already said, there is no comprehensive national space legislation in Brazil now. However, Brazil has some sparse legal instruments like Law No. 8.854 (1994), which created the AEB, Decree No. 1.332 (1994), which establishes the PNDAE, whose primary instrument is the PNAE, Decree No. 1.953 (1996), which creates the SINDAE and Decrees No 9.279 (2018) and 9.839 (2019), which provides the CDPEB.

The discussion about the need for a national space law in Brazil is not recent. In 2013, Professor J. Monserrat Filho, then head of the International Cooperation Department at AEB, at the time of the publication of the PNAE 2012-2021, reported on the creation of a working group, within the scope of the SBDA, for discussion and preparation of a draft proposal of the "Act of Space Activities in Brazil".[14] The result of this work was published on the SBDA website and served to support some debates about the need and relevance of a national space law.

After a few years the CDPEB was created, a committee directly linked to the Presidency of the Republic, whose main objective is to establish the guidelines and goals for a more robust national space program. It enabled the creation of Technical Groups (GTs) to study and improve a series of themes related to space activities in Brazil (more details in the next section).

In 2018 the Technical Group No. 12 was created, from now on GT-12, whose goal was to develop a draft bill of the Brazilian national space law. On September 30, 2020, the Committee, in its plenary meeting, approved its final report, culminating in the final steps for submitting the bill of the Brazilian National Space Law.

In the next section some additional topics that should be considered in a future Brazilian space law are presented.

12 A. Froehlich, V. Seffinga, National Space Legislation: A Comparative and Evaluative Analysis, Springer, Cham, 2018.

13 A. Froehlich, V. Seffinga, National Space Legislation: A Comparative and Evaluative Analysis, Springer, Cham, 2018.

14 M. Alvarenga dos Santos, P. de Souza, I. Grosner. A necessidade de uma lei geral do espaço no Brasil, Revista de Direito da UnB, v. 4. n. 3 (2020), 106-138.

7. Additional Topics

On November 6, 2013, in Guangzhou, China, during the Third Plenary Session of the China-Brazil High-level Coordination & Cooperation Committee (COSBAN) the two countries signed the China-Brazil Ten-Year Space Cooperation Plan to last from 2013 to 2022. The Ten-Year plan embraces the following seven fields of cooperation: space technology; space sciences; space applications; launch services; TT&C support; units, components, and ground equipment; human resources. With the approaching end of the decade covered by the plan it is time to start thinking on the common principles that could guide the future of this successful bilateral cooperation that started in 1988. This topic on international cooperation should join the Artemis Accords and the ISECG due to its relevance for the Brazilian Space Program.

On February 6, 2018, through Decree No. 9.279, the CDPEB was created, whose main objective was to establish guidelines and goals for a more robust national space program. This scope was expanded by Decree No. 9,839, of June 14, 2019, which revoked the first one. Among its activities was the possibility of creating Technical Groups (GTs). Thus, the GT-1 (governance), the GT-2 (Technological Safeguards Agreement), the GT-3 (liquidation of the binational company Alcântara Cyclone Space – ACS), the GT-4 (company to the GT-5 – mobilizing project), the GT-6 (VL-X Launch Vehicle), the GT-7 (land and property issues of the Alcântara Launch Center – CLA), the GT-8 (plan for marketing and public relations), GT-9 (DCTA human resources), GT-10 (continuation of GT-7), GT-11 (alternatives for financing the mobilizing projects), GT-12 (General Space Law) and the GT-13 (plan to occupy the area of the Alcântara Space Center, which replaced the GT-7 and GT-10).

8. Conclusions

The need for a general space law in Brazil is evident and the country is showing efforts in that direction by establishing a working group, which, on September 30, 2020, approved the draft bill of the law.

At this moment, when the AEB and the MCTI are formulating and reformulating, the National Space Policy (PNE), the National Space Strategy (ENE), and the Brazilian Space Program (PEB), the first two at least in the shape of decrees, an additional reflection on the paths that Brazil intends to follow is mandatory, and on how the law, in its formal sense (art. 59, III, CF), could contribute to making this path safe and prosperous.

Economic development, through innovation and the exploration and use of space for private activities (the so-called New Space), must be pursued, following the global trend. As Brazil has been doing over six decades of its space program, the development of scientific and technological knowledge

needs to be made explicit in the PNE, ENE and PEB, as a form of achieving social and economic development.

Nevertheless, the distinction between civil activities, which should be the motto of a Brazilian Space Program, and Defense activities, must be clear in the intended general law. The law, as well as the other instruments that guide the Brazilian Space Program, should aim at strengthening international cooperation and complying with the universal principles agreed upon by the UN.

This article analyzed the national space legislation and the space legislation of other States to, finally, propose the minimum regulatory provisions that a Brazilian General Space Law shall contain in order to foster the space sector in the country and serve as a starting point for other initiatives of the same kind. However, since it will be generic in its provisions, it was noted that specific and detailed arrangements will not be incorporated into the Law. They shall be part of derivative instruments, such as norms, rules and guidelines, whose adoption, revision, and amendments are easier to implement, in order to follow the ever-increasing progress of the area.