

# Recent Brazilian Initiatives to Address Legal Gaps and Barriers That Negatively Impact the Development of the National Space Industry

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## Abstract

When trying to construct a national space industry, developing nations are often hindered by limited financial resources and a lack of technical expertise. This situation is compounded by legal gaps and barriers that prevent governments from properly addressing these challenges, and also create uncertainty for private investors. The example of Brazil is particularly illustrative: although the country has set out a clearly defined national space policy (National Policy for the Development of Space Activities (PNAE) 2012-2021), it is burdened with legal and managerial obstacles that prevent the policy from achieving its aims. These obstacles include the lack of a general national space law combined with the existence of a fragmented regulatory regime and a complex tax system that especially encumbers the private sector. Additionally, the Brazilian Space Agency (AEB) lacks the necessary financing and autonomy required to function in its role as coordinator of the National System for the Development of Space Activities (SINDAE), which itself is badly fragmented. In order to address these issues, there should be efforts to improve domestic cooperation amongst government agencies as well as the private sector by focusing on common national goals. In this regard, the National Council for the High Studies and Technological Evaluation of the Brazilian House of Representatives examined some alternatives that the national government could adopt to foster the development of space activities. The Council suggested that the implementation of a PNAE should be pursued further, and proposed the passage of a bill, currently under review in the Senate, to provide tax incentives, including tax cuts, in order to stimulate the importation of goods to be used

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by the space industry. Such a law would act similarly to the Provisional Decree n. 544/11, passed in 2012, which revised national security policies in order to rescind some taxes as well as simplify the importation of goods used by the defense space industry. Since many space technologies are dual-use, such a law could positively affect the private sector as well. Another approach is to view Brazilian space activities as a combined priority for both civil and military programs, including reforming existing legal and regulatory regimes in order to create a more effective structure for development of space activities in order to avoid both fragmentation and duplication of objectives amongst various government agencies. This paper aims to analyze these recent initiatives, and to assess their impact on the Brazilian space industry. This includes an examination of the legal gaps in the Brazilian space sector which could be addressed by the enactment of the general law for space activities which, in turn, would simplify the existing system by improving financial and managerial functions of the Brazilian Space Agency; and the removal of unnecessary legal barriers that impede the operation of the domestic space industry. The authors hope that their analysis could assist other developing nations that presently facing similar challenges.

## 1. Introduction

The nation of Brazil has more than 8.5 million km<sup>2</sup> of terrestrial domain and 4.5 million km<sup>2</sup> of maritime domain, and possesses extensive and unique rich natural resources such as the Amazon forest. In fact, Brazil is the 5<sup>th</sup> largest country in the world, behind Russia, Canada, the United States, and China. Satellite technology ideally can and should assist such a large country to more effectively protect, study, and monitor its territory, its natural resources, and its population. A developing country, however, particularly one the size of Brazil, faces a constant challenge to efficiently manage and coordinate its national space activities, including the establishment of an independent national space industry, in order to benefit from the technological resources that would result from such activities. Additionally, a more effective and fully developed domestic space industry would utilize existing national resources, including the two launching centers that exist in Brazil (“Alcantara” and “Barreira do Inferno”<sup>1</sup>), which have a special location close to the Equator, yet have been underused by the country. Finally, although the Brazilian space program began at the onset of the space age,<sup>2</sup> it still faces structural problems and difficulties that provide continuity, stability, and consistency for its space activities.

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1 Centro de Lançamento da Barreira do Inferno (CLBI), criado pela Portaria no S-139/GM3, de 12 de outubro de 1965, na cidade de Natal, no estado do Rio Grande do Norte/RN e o Centro de Lançamento de Alcântara (CLA), inaugurado posição geográfica foi considerada a que oferece a melhor relação custo-benefício para lançamentos, com economia de combustíveis de até 30%.

2 O Brasil tem longa história de dedicação a atividades de pesquisa e desenvolvimento para exploração do ambiente espacial. Em 1961, foi criado o Grupo de Organização da Comissão Nacional de Atividades Espaciais (GOCNAE), mas o avanço foi dado com o lançamento da Missão Espacial Completa Brasileira (MECB), em 1979.

## 2. An Overview of the Brazilian Space Program

The Brazilian space program has been developed at the institutional level through the PNAE, which was established by the Decree no 1.332, from 8 December 1994,<sup>3</sup> which defines the objectives and guidelines for the national space programs and related projects. Pursuant to the decree, the execution of the PNAE was decentralized as part of the National System for the development of space activities (SINDAE).<sup>4</sup>

The Brazilian Space Agency (AEB)<sup>5</sup> is the central organ of the SINDAE, and is responsible for coordinating proposals (and reviews) of PND AE as well making revisions and updates to the PNAE. The agency also is charged with executing and maintaining the actions of the PNAE.

Two research institutions are essential both to the execution of the PNAE as well as to the continuity of the research development regarding space activities in Brazil (1) the National Institute of Space Research (INPE),<sup>6</sup> under the authority of the Ministry of Science, Technology, Innovations and Communications (MCTI),<sup>7</sup> and (2) The Space and Aeronautics Institute (IAE), which is linked to the Aerospace Science and Technology Department (DCTA)<sup>8</sup> and the Aeronautics Command (COMAER)<sup>9</sup> under the authority of the Ministry of Defense. Additionally, within the academic realm, the Aeronautics Technology Institute, which is also linked to the DCTA, is excellent source for providing human resources to the space field.

The main objective of the above-mentioned research institutions is to promote research and development in order to reach innovation and capacity building, as well as providing the national space industry with competitive human and strategic technological resources sufficient to meet the rigorous standards required in the international the space industry.

Despite the fact that the PNAE was well structured, it has faced administrative, financial, and human resources limitations which, in turn, has contributed to the creation of uncoordinated projects that end up competing amongst themselves

3 Available at <http://www.aeb.gov.br/wp-content/uploads/2013/01/PNAE-Ingles.pdf>.

4 It was established by Decree no. 1953/96, available at (Portuguese version): <http://presrepublica.jusbrasil.com.br/legislacao/112231/decreto-1953-96>.

5 A Agência Espacial Brasileira (AEB), orgao de natureza civil foi instituida pela Lei 8.854, de 10 de novembro de 1994, inicialmente vinculada à Presidência da República foi, em 1996, transferida para a alçada do Ministério da Ciência e Tecnologia. A AEB repassa verbas ao INPE, ao DCTA e a algumas outras instituições. As verbas destinadas ao DCTA financiam projetos do próprio DCTA e a seus institutos, bem como os Centros de Lançamento de Barreira do Inferno, no Rio Grande do Norte, e de Alcântara, no Maranhão. Em 2015, o INPE conseguiu que o MCTI decidisse lhe repassar diretamente parte da verba antes repassada pela AEB.

6 About INPE, see its website at: <http://www.inpe.br/ingles/>.

7 About MCTI, see its website at (Portuguese version): <http://www.mcti.gov.br>.

8 About DCTA, see its website at (Portuguese version): <http://www.cta.br/>.

9 About COMAER, see its website at <http://www.defesaareanaval.com.br/?s=comaer>.

rather than complementing each other instead. As a consequence, there are predictable delays in the fulfilment of established programs and chronograms.

The AEB faces similar challenges. For example, the agency has both limited personnel and a limited budget, which compromises its ability to efficiently coordinate the complex geography of the Brazilian space program, which is comprised of numerous stakeholders from private industry, academia, research institutions, government ministries, organs of public administration, and public and private companies, to name just a few.<sup>10</sup>

In 2012, Brazil also established the Strategic Program of Space Systems (PESE)<sup>11</sup> as part of the National Strategic Defense (END), and which initiated its activities in 2015 with a plan for the next 15 years, or until 2030. The PESE was approved by the Decree 6.703, of 18 December 2008, and is primarily focused on the modernization and restructuring of the Defense Industrial Base (BID)<sup>12</sup> both within the short, medium, and long term. The PESE also plans the creation and development of dual use (military and civil) technology. According to the objectives of the program, the PESE will effectively contribute to the execution of the PNAE, particularly in areas of interest that are defined at the Defense National Strategy (END) and which give priority to military needs while simultaneously complementing capacities that are not foreseen by the PNAE.<sup>13</sup>

Additionally, the Defense National Strategy (END) aims to improve the monitoring of the national territory through remote sensing, including Brazil's air space and frontiers. The demand for such remote sensing could incentivize the development of the presently incipient domestic industry. For instance, sufficient demand coupled with adequate financing resources and an effective regulatory regime, could benefit the national space industry as a whole. Other factors important in this regard is the attraction, training and retention of qualified personnel, as well the maintenance of a national demand, in order for the local industry to be further developed and nurtured over the long term. Brazil currently depends largely on international technology in order to participate in space-related activities. In order to change this reality, the country needs to properly take advantage of the experience and infrastructure of its existing consolidated research institutions such as INPE and DCTA in order to develop national technologies which, in turn could assist in the development of

10 Câmara dos Deputados. Cadernos de Altos estudos 7. A política Espacial Brasileira, consultável on line <http://www2.camara.leg.br/a-camara/altosestudios/arquivos/politica-espacial/a-politica-espacial-brasileira>.

11 Detailed information about PESE and the END, see the website at [http://www.defesa.gov.br/projetosweb/estrategia/arquivos/estrategia\\_defesa\\_nacional\\_portugues.pdf](http://www.defesa.gov.br/projetosweb/estrategia/arquivos/estrategia_defesa_nacional_portugues.pdf) (available in portuguese).

12 For informations about the BID, see at the website: <http://www.defesa.gov.br/industria-de-defesa/base-industrial-de-defesa>.

13 Ver artigo intitulado "O PESE não é somente da Aeronáutica" in <http://panoramaespacial.blogspot.it/2015/03/o-pese-nao-e-exclusivo-da-aeronautica.html>.

the domestic space industry. In addition, the formation of conduits between research centers and the private sector could facilitate the development of autonomous technologies that could serve as the basis for the development of an independent national space industry. Finally, an understanding of the value and possible contributions of each potential stakeholder is crucial in improving the management of national space activities, including establishing effective mechanisms to facilitate and improve the coordination amongst them in order to combine complementary efforts while avoiding initiatives that are duplicative in nature and/or lack the necessary support to succeed.

### 3. **The Brazilian Space Industry: An Overview of Its Recent Developments and Current Challenges**

Since the 1960's Brazil has had a commission tasked with developing a national space programme, which led to the development of both a satellite launch vehicle (VLS) as well as a successful family of sounding rockets named SONDA,<sup>14</sup> and in which the national space industry played a crucial role.

The Brazilian satellite launch vehicle programme (VLS) includes the VLS-1, which is the first Brazilian satellite launcher.<sup>15</sup> A total of three VLS-1 prototypes were assembled, and two lift-offs were accomplished from the Alcantara Launch Center (CLA). In 2003, however, during the mission Sao Luis which included the third prototype, there was a catastrophic accident,<sup>16</sup> That resulted in the imposition of several technical modifications and even some system redesigns. Currently, the Brazilian launching programme has been focused on the Microsatellite Launch Vehicle (VLM), which is part of an international cooperation agreement with Germany.<sup>17</sup>

The Brazilian space industry works with, *inter alia*, small satellites, satellite structures, payloads, satellite equipment, ground systems, propulsion, sounding rockets and launchers. It also offers services related to the usage of satellite images and other specialized services.<sup>18</sup> EMBRAER<sup>19</sup> is main player

14 About the Brazilian sounding rocket programme see at <http://www.oosa.unvienna.org/pdf/pres/stsc2014/tech-44E.pdf>.

15 The VLS-1 was designed for a payload up to 250 kg to reach the LEO orbit (up to 700km). It is composed of four solid fuel propulsion stages, and it belongs to the class of small launchers. More details see at <http://www.iae.cta.br/site/page/view/en.vls1.html>.

16 Frans von der Dunk, Current and Future Development of National Space Law and Policy, University of Nebraska, 2005, at 44. Available at <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1011&context=spacelaw>. See also at [http://usa.today30.usatoday.com/news/world/2003-08-22-brazil-rocket\\_x.htm](http://usa.today30.usatoday.com/news/world/2003-08-22-brazil-rocket_x.htm).

17 See at the AEB website: <http://www.aeb.gov.br/iae-e-dlr-realizam-workshop-do-vlm-1/>.

18 From more informaions see: <http://www.aiab.org.br/site-ingles/industria-aeroespacial.asp>.

19 See its website at <http://www.embraer.com/en-US/Pages/Home.aspx>.

in the Brazilian aerospace/space industry, and has recently been involved in the creation of *Visiona Tecnologia Espacial*, a joint venture between TELEBRAS and EMBRAER whose purpose is to manage the development of the Geostationary and Defense and Strategic Communications Satellite (SGD).<sup>20</sup> In addition, other Brazilian companies have established expertise in key areas including AVIBRAS (sounding rockets and missiles),<sup>21</sup> Aeroeletronica (avionics and other electronics), CENIC (composite materials),<sup>22</sup> Elebra/NORCAL Group (Electronics), TECNASA (electronics for air navigation support and radar countermeasures), Mectron (defense systems), Digicon (transducers and precision mechanics), and AKROS (structural analysis and CAD).<sup>23</sup>

Nevertheless, unlike highly-developed, more sophisticated space programs, the Brazilian space program has not emphasized or even appreciated the existence its national space industry, at least not to degree it should have. Such is the conclusion of the Brazilian Aerospace Industry Association (AIAB)<sup>24</sup> which contends that the industry is considered by most entities to be a mere supplier of goods (components and equipments) to research institutions like INPE, which retains the exclusivity right to develop the satellite projects. AIAB maintains that the same problem is faced both by launchers and the IAE as well.<sup>25</sup>

Additionally, some representatives from the Brazilian space industry believe that although there exists a constant demand for national space products and applications, this demand cannot be maintained because of two primary factors: the refusal of international suppliers to fulfill this domestic demand, and the lack of governmental policy that aims to achieve results in the long term. Moreover, according to numerous national entrepreneurs, the maintenance of strategic space programs in Brazil requires, at a minimum, continuity of the domestic demand as well as of government policies that support this demand. In the absence thereof, the Brazilian space industry lacks the necessary conditions to develop.<sup>26</sup>

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20 For more information see at the website of Visiona: <http://www.visionaespaial.com.br> (currently available only in Portuguese).

21 See at <http://www.avibras.com.br>.

22 See at <http://www.cenic.blz>.

23 See Global Security report, available at <http://www.globalsecurity.org/space/library/report/2003/brazilspace.pdf>.

24 The Brazilian Aerospace Industries Association (AIAB) was established to represent the interests of those Brazilian companies working in aerospace (and space) engineering.

25 “*Cenário e perspectivas da Política Espacial Brasileira*” in Cadernos de Altos Estudos 7. Política Espacial Brasileira (Câmara dos Deputados). <http://www2.camara.leg.br/a-camara/altosestudios/arquivos/politica-espacial/a-politica-espacial-brasileira>.

26 “*A indústria e os obstáculos ao desenvolvimento de pesquisas, produtos e aplicações na área espacial no Brasil*”. in Cadernos de Altos Estudos 7. Política Espacial

Despite these difficulties, however, it is commonly accepted that since the beginning of the space age, Brazil has understood the crucial importance of dominating space technologies and how these technologies are directly related to national defense and the protection of national autonomy. In this regard, efforts to develop technology through the implementation of space projects designed to build satellites began in 1980. By way of example, two small satellites designed for data collection, the SCD-1 and SCD-2, were successfully constructed and launched in 1993 and 1998 respectively. The fact that both satellites currently remain operational is remarkable, particularly if one considers that the SCD-1 was designed and expected to be operational for only one year.<sup>27</sup>

International cooperation is another important element in the development of Brazilian space activities and, depending on the terms of cooperation, can also become an important source of support for the development of the national space industry generally. For example, Brazil and China have recently successfully developed through joint cooperation five remote sensing satellites (China-Brazil Earth Resources Satellite, CBERS).<sup>28</sup>

Another important element in successfully developing a national space industry is the relationship between the space industry and domestic universities, in particular centers of excellence in the country. These centers generally train individuals who are then able to work in any engineering research laboratory, including those at private companies. According to a study by a group of professors from Campinas University (UNICAMP),<sup>29</sup> however, there is no effective coordination between what is produced by national universities regarding technology and innovation and the requirements of the domestic space industry. Accordingly, coordination between industry needs and university production could and should be improved, particularly when compared with the similar relationship that exists between other types of industry and research centers which is more focused in the technological research, and in which the research centers exercise a more important role as a source of information in the process of creating new technologies and working toward innovation. In other words, universities noted for their technological achievements need to be better utilized both in developing human resources for the domestic space industry and to also foment innovation and projects related to space.

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Brasileira (Câmara dos Deputados). <http://www2.camara.leg.br/a-camara/altosestudios/arquivos/politica-espacial/a-politica-espacial-brasileira>.

27 See more information at:

[http://www.inpe.br/noticias/noticia.php?Cod\\_Noticia=3198](http://www.inpe.br/noticias/noticia.php?Cod_Noticia=3198).

28 See informations about CBERs Programm at: <http://www.cbbers.inpe.br/ingles/>.

29 See: <http://www.scielo.br/pdf/spp/v14n3/9780.pdf>.

#### **4. Analysis of Current Initiative Regarding the Domestic Legal and Regulatory Framework Affecting the Development of the Brazilian Space Industry**

Space projects generally combine unique characteristics: high complexity, high costs, high risks, long term duration, and the need for high specialized human resources.<sup>30</sup> Combining these characteristics successfully requires both a favorable national policy as well as a proper legal and regulatory regime in order to create an atmosphere in which space-related activities can successfully develop. In addition, the space field has its own particularities and unique characteristics which must be considered when devising policies, regulations, and laws designed to oversee the industry.

Legal gaps and excessive or complex regulatory regimes often work against the development of a national space industry, and these issues must be addressed so that the private sector has the confidence sufficient to invest in the industry. Additionally, there is a need to balance the necessity of regulation while avoiding its excess, which ideally should be defined by a clear national policy that is fully cognizant of the unintended consequences of regulation, especially overregulation, within the contours of any given national space program. Moreover, devising such a legal a regime should not merely a matter of achieving one solution for the long term, but should also include the capacity of being able to adjust to the changing realities and new challenges that are bound to arise in the future.

Unfortunately, national laws regarding space activities often do not achieve the afore-mentioned objectives. For example, pursuant to current Brazilian legislation, companies developing space goods must agree to a fixed price in delivery of their final products, despite the risks and costs that are generally involved in the development of such technologies. In addition, lack of experience is a significant problem in this context, as it is quite common for space equipment to be designed and manufactured for the first time and, therefore, the industry has no experience regarding possible unforeseen events that could affect the final price. This can create an unsurmountable barrier for small and medium companies to participate in space-related technological development, as they simply cannot afford either the costs or the risks associated with such an enterprise.

Another problem of the current Brazilian legal regime governing space activities and which has a profoundly negative impact on the domestic space industry relates to that of taxation. For example, although there is a tributary tax exemption for the importation of certain space goods, the very same goods

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30 This paper does not address small satellites, because their particular characteristics could lead to a different analysis. The authors recognize, however, that these satellites characteristics could represent an opportunity for a “game change” for developing countries like Brazil. The authors intend to address this in a separate paper.



frequently are heavily taxed domestically by different tax tributes (PIS, COFINS, and ICM),<sup>31</sup> a situation that obviously creates an unfair and unequal playing field in which the domestic space industry must develop. Additionally, the PNAE faces significant budget problems, especially concerning the lack of resources of the Space Sectorial Fund,<sup>32</sup> which ideally should receive financial resources from the commercial exploration of space including the sale of orbits.

Law 8.666, from 21.06.1993, which defines the rules regarding public procurement, also hinders development of the national space industry. indeed, this law is considered as a disincentive to national production generally, as the processes mandated by this law are very expensive, lengthy, and do not differentiate public procurements made for space from those of other sectors.<sup>33</sup> It is worth noting at this juncture, Law 12.598, from 21 March 2012,<sup>34</sup> which includes within its provisions (Chapter IV) the Special Regime for the Brazilian Aerospace Industry (RETAERO). This law promulgates and defines special rules relating to the purchase and sale, contracting, and development of defense products and systems, and also establishes incentives to invest in the strategic space field.

While, law 12598/12 has defined taxes benefits, it has not, however, changed the Brazilian space industry situation in general, which continues to lack a strong, national supportive policy, and his uncertainty continues to lead to a lack of investment in the space sector. if this circumstance is to change in the future, there must be a transformative kind of entrepreneurship whereby there is minimum of requisite knowledge of the industry complemented by laws, policies, and regulations which promote, rather than discourage, investment in the space sector.

Other challenges of the Brazilian space program involve the difficulty in promulgating and implementing legislation that establishes a differentiated procurement regime for technological goods, and a similar lack of legislation that could improve contracting and capacity building in the space industry

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31 PIS – Social Integration Program Contribution; CONFINS – Social Security Contribution; ICMS – Tax on the Circulation of Goods, Interstate and Intercity Transportation and Communication Services.

32 The Space Sectorial Fund is part of the “Science and Technology Sectoral Funds”, created in 1999. It is an instruments for financing research, development and innovation projects in Brazil – projects that should create partnership and stimulate investment in technological innovation by companies, contributing to improve their products and processes and also balance the relationship between public and private investments in science and technology. See: <http://www.finep.gov.br/a-finep-externo/fontes-de-recurso/fundos-setoriais/o-que-sao-fundos-setoriais> (Portuguese only).

33 See the law text in [http://www.planalto.gov.br/ccivil\\_03/leis/L8666cons.htm](http://www.planalto.gov.br/ccivil_03/leis/L8666cons.htm) (portuguese).

34 The full text of the law can be found at [http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2012/Lei/L12598.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/Lei/L12598.htm).

through the existence of more flexible and efficient regulatory regimes of the kind that currently govern the public and military sectors.

In addition to law and policy, efficient contracts for creating and establishing common space projects are also essential to the financial success of the industry. Contracts need to be simple and clear, and should include simplified processes through which their obligations can be imposed, thus bringing more certainty to commercial relations in addition, while such contracts should be detailed oriented, they also must be flexible enough to be completed within relatively short time frames. Finally, creating legal mechanisms that would mitigate legal risks, including being subject to litigation and/or providing immunity, is another important element in this regard.

It is worth mentioning here that an attempt to address legal gaps and barriers affecting the development of the national space industry occurred through the passage of Law N°10.973 from 02.12.2004.<sup>35</sup> This law is recognized as the “Innovation Law” because it represented a significant step in the regulating of relationships between universities and the private sector, which, in turn, would hopefully promote investment in innovation. The law also promoted collaborative efforts for the development of scientific production that was aligned with industry demand. The knowledge and expertise generated by universities and research institutions as a result of this law has resulted in direct benefits to Brazilian society in several ways, including the possibility of manufacturing and developing new goods and services which improve the overall quality of life of the population.

Criticism of the “Innovation Law” generally refers to its complexity and its failure to adequately address access to financial resources. In addition, the law is considered to be imprecise and vague, thus opening the door for different, often conflicting interpretations. Consequently, due to this complexity and lack of clarity, the private sector remains conservative in terms of investments based on the “Innovation Law”. In other words, industry is fearful of their accounts being contested by the government based on their misunderstands of the law. Ironically, in spite of the fact that this legislation was created to provide the necessary regulatory environment to incentivize industry to invest in innovation, its lack of definitional and legal clarity is, in fact, creating exactly the opposite scenario.

Another important attempt to support the development of the national space industry comes from the National Council for the High Studies and Technological Evaluation of established by the Brazilian House of Representatives. he Council had as part of its mandate the promotion of a series of public hearings, forums, and seminars as part of a study entitled “The

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35 See the text of the law in [http://www.planalto.gov.br/ccivil\\_03/\\_ato2004-2006/2004/lei/110.973.htm](http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2004/lei/110.973.htm).

Brazilian Space Policy,”<sup>36</sup> the objective of which was to investigate and understand the causes of successive delays of the goals and schedules established by the Brazilian Space Program (PEB). Once these causes were identified, the study proposed some solutions to overcome various difficulties and limitations, with the primary objective to stimulate national space activity. Another important objective of the study was to create public awareness regarding the relevance of national space activities in the country by publicizing the domestic space policy, and engaging with the population accordingly.

One of the outcomes of this study was the promulgation of a project of law, 7.526/2010,<sup>37</sup> which is currently under review by the Brazilian legislature. This project defines incentives for innovation as well as scientific and technological research in the space sector. The project also creates the Program of Support to the Technological Development of the Industry (PADIE), and guarantees tax benefits to companies that produce goods or provide services related to the nation’s space activities, including exemption from taxes for industrialized goods (IPI).

In addition, project of law 7.526 also promotes the following points in order to incentive the domestic space industry:

1. Passage of specific policies regarding government procurement for the space and defense sectors similar to the one established for national defense, in order to focus on programs in the long term, achieving several years of implementation, and emphasizing the relevance of contracts with the industry for the design and production of innovative goods and services of strategic technology.
2. Defining the responsibility of the State to provide industry with a policy regarding the space sector, including more efficient use of opportunities offered by the current legislation, and using the government’s economic capacity to purchase in order to leverage greater participation from both civil society and the private sector in the space program.
3. Promoting dialogue and understanding amongst organs of coordination and execution both of the PNAE and the agencies of public administration and control in order to overcome doubt and resistance to the application of the “Law of Innovation.” moreover, if the law is further clarified and well received, it is expected to promote a more efficient interaction between the Science and Technology Institutes (ICTs) and private companies, in turn strengthening the ability of smaller companies to develop technology.

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36 Can be found at <http://www2.camara.leg.br/a-camara/altosestudios/arquivos/politica-espacial/a-politica-espacial-brasileira>.

37 The full content of the project is available at [http://www.camara.gov.br/proposicoesWeb/prop\\_mostrarintegra;jsessionid=26A2C5F368D36710103F560FCD16B8B6.proposicoesWeb1?codteor=783397&filename=PL+7526/2010](http://www.camara.gov.br/proposicoesWeb/prop_mostrarintegra;jsessionid=26A2C5F368D36710103F560FCD16B8B6.proposicoesWeb1?codteor=783397&filename=PL+7526/2010).

In addition to the conclusions of the afore-mentioned study, all of which seek to overcome the known barriers regarding the development of the domestic space industry, one could also propose the following changes: the same level of taxation (or exemption) for both imported and national goods; the strengthening of the production chain in Brazil by providing a constant sufficient demand; an increase of government investment in the industry; the expansion and adjustment of available public and private financing; and the international promotion of industry.

## 5. Conclusions

The study developed by the National Council – the Brazilian Space Policy concluded that the lack of a common understanding amongst different stakeholders – society, government, industry and academia – was the most relevant problem pertaining to the national space program, meaning that the lack of an appropriate and legitimate government oversight imposed several barriers to the development and coordination of an efficient program.

The Brazilian space industry was created mostly due to the demands from CBERS, which were established as a consequence of the cooperation agreement between China and Brazil in 1988, and the industry continues to be dependent on its demands. Notwithstanding this fact, however, it is also true that Brazil still lacks a well-structured legal and regulatory space policy that is consistent with the existing legislative and regulatory regime, in order to support and promote the development of the domestic space industry. The passage of such a policy should be directed not only to the national market, but should be flexible enough to affect the regional and international market as well. By way of example, Brazil could contribute to, and benefit from an international cooperation in the Latin America region or even in Africa.

Another important point to be addressed is development of proper coordination between the two national space programs: PNAE and PESE. Although these are independent programs, they ideally should work together in a permanent collaboration. Such close cooperation was proposed by the project of law of the Brazilian general law of space activities, which was prepared by the Space Law Study Group (NEDE) of the Brazilian Association of Air and Space Law (SBDA).<sup>38</sup> Thus far, however, there still appears to be no coordination between the two programs, with each on generating their own demands within the national space industry. Moreover, these demands are not protected from the economic crises that currently affecting many countries in the world.

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38 See the article: “The Challenges in Drafting National Law for Space Activities – A Brazilian Experience”, A.C. van Oijhuizen Galhego Rosa, Macedo Scavuzzi dos Santos & T. Viana in *Proceeding of the International Institute of Space Law*, 2014.

Despite all of the challenges discussed in this paper, however, some of the Brazilian initiatives still exist and are functional. For instance, CBERS has been very active, with the project CBERS-4<sup>a</sup> having just been approved by the Brazilian Senate. In addition, exports play an important role in keeping some companies in business, while the construction of small satellites offers potential opportunities for domestic investors.

Nevertheless, it appears that now, more than ever, Brazil requires the promulgation of a general space policy which includes a proper legal and regulatory framework that recognizes and helps to resolve the numerous challenges discussed in this paper.

