

# China and Brazil's Cooperation in the Satellite Sector

## Implications for the United States?

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### Abstract

This article analyzes the long-standing cooperation between Brazil and China in the satellite sector, which has received little attention in the literature despite its strategic importance. The competition for the use of outer space, in which China and the United States are key players, underscores the significance of this cooperation. The article argues that this cooperation has implications for US interests, which can be viewed through the lens of triangular relations in two dimensions: contestation and competition. To identify these implications, the study conducts a content analysis of bilateral agreements in the satellite sector signed between Brazil and China from 1984 to 2022. The findings provide insights into the triangulation of bilateral cooperation between Brazil and China and US interests in the satellite sector. This study contributes to the broader debate on the strategic competition in the Indo-Pacific region and highlights the need for further research on the implications of Brazil-China cooperation for US interests.

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The United States has historically been the dominant power in the space sector. However, Beijing's significant investment in and development of its own technology in this field have positioned China as a rising challenger to US hegemony. Experts have extensively studied the impact of China's ascent on US national security, but there is a lack of literature on the role of third parties, particularly in Latin America. Brazil was the first Latin American country to partner with China in the satellite sector, paving the way for the first strategic partnership between the two nations in 1993. Brazil also boasts the largest aerospace program in the region, with China as its primary partner. Despite concerns from the Washington about China's growing economic presence in Latin America, little attention has been given to the strategic implications of China's satellite cooperation with Brazil. Given the critical importance of the satellite sector and the limited research in this area, it is crucial to explore whether China's satellite cooperation with countries like Brazil could impact US interests.

The issues of contestation and competition in outer space are crucial to consider, as highlighted in the US *National Security Space Strategy* of 2011.<sup>1</sup> This document recognized the challenges posed by China's growing role in satellite technology and outer space utilization. To further explore the relationship between Brazil and China in the satellite sector, a triangular relations perspective is proposed, assuming that the three states are in a synchronized relationship where the interaction between any two affects the third. To analyze this relationship, a content analysis of the bilateral agreements signed between Brazil and China in the satellite sector from 1984 to 2022 is applied.

The article is structured into three sections. First, it provides an overview of the historical development of the relationship between China and Brazil in the satellite sector. Next, it examines and discusses the potential implications of Brazil–China cooperation in the satellite sector for US interests. The article concludes with some final considerations, suggesting avenues for future research on the subject.

### **Brazil–China Satellite Cooperation**

The cooperation between Brazil and China in the satellite sector played a fundamental role in establishing their bilateral relationship. This partnership was formalized in 1984, when both countries agreed for the first time to incorporate satellite cooperation into their bilateral relationship.<sup>2</sup> The agreement included the development of communication satellites, remote-sensing observation and image-processing satellites, launching rockets, and sounding rockets. In March 1988, the Brazilian National Institute for Space Research (INPE) and the Chinese Academy of Space Technology (CAST) signed a joint agreement to research and produce the China–Brazil Earth Resource Satellite (CBERS). In 1993, the partnership was expanded, leading to the establishment of the first strategic partnership between Brazil and China. This instrument strengthened the bilateral relationship in other sectors, including the commercial sector, with the CBERS program remaining an important pillar of the partnership.

The CBERS program was established to develop satellites for meteorological and telecommunication purposes in geostationary orbit. The first satellite, CBERS-1, was launched in 1999, followed by CBERS-2 in 2003, which also provided satellite

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<sup>1</sup> Department of Defense and Office the Director of National Intelligence, *US National Security Space Strategy* (Unclassified Summary, January 2011); and Department of Defense, *Defense Space Strategy* (Summary, June 2020)

<sup>2</sup> “Complementary Adjustment to the Scientific and Technological Cooperation Agreement,” signed on 29 May 1984 in Beijing.

images to some African countries as part of South–South cooperation between Brazil and China. CBERS-2B was launched in 2007, and Brazil and China agreed to develop a second generation of CBERS satellites (CBERS-3 and -4). According to Robert Newberry, the technological advancements and increased Brazilian investment and development in the second generation of CBERS satellites raised concerns in some US spheres.<sup>3</sup> Newberry argued that the United States should pay closer attention to satellite programs in Latin America and their potential impact on US national security interests. While he classified Brazil as a US colleague in the satellite sector, he also identified it as a competitor.

The CBERS-3 and CBERS-4 satellites were launched in 2013 and 2014, respectively. In 2015, Brazil and China signed an agreement to develop and launch a sixth satellite, CBERS-4A, which was finally launched in December 2019. The CBERS program has been crucial for Brazil in various areas, including deforestation control and environmental monitoring in the Amazon region, water resources monitoring, urban growth, and soil occupation, as well as for educational purposes.<sup>4</sup>

During the sixth meeting of the Sino-Brazilian High-Level Commission (COSBAN) held virtually in May 2022, the vice presidents of Brazil and China, Hamilton Martins Mourão and Wang Qishan, respectively, expressed their intention to continue with new projects in the bilateral cooperation in the satellite sector. Among these projects are the construction of two more satellites, CBERS-5 and CBERS-6, as well as the preparation of the next Bilateral Cooperation Plan 2023–2032. This intention has been formalized in a recent bilateral agreement, which, according to press reports, was signed during Brazilian President Lula da Silva’s visit to Beijing on 14 April 2023.<sup>5</sup> This demonstrates that Brazil’s cooperation with China in the satellite sector remains a strategic pillar of the bilateral relationship, regardless of which party is in power in Brasília or its ideological orientation.

The following analysis examines the bilateral agreements that have been signed between Brazil and China in the satellite sector. Bilateral agreements serve as official documents that help identify shared interests, objectives, and the evolution of the agreements’ content over time. Most importantly, they provide insight into specific clauses that may indicate the depth of cooperation between the two countries.

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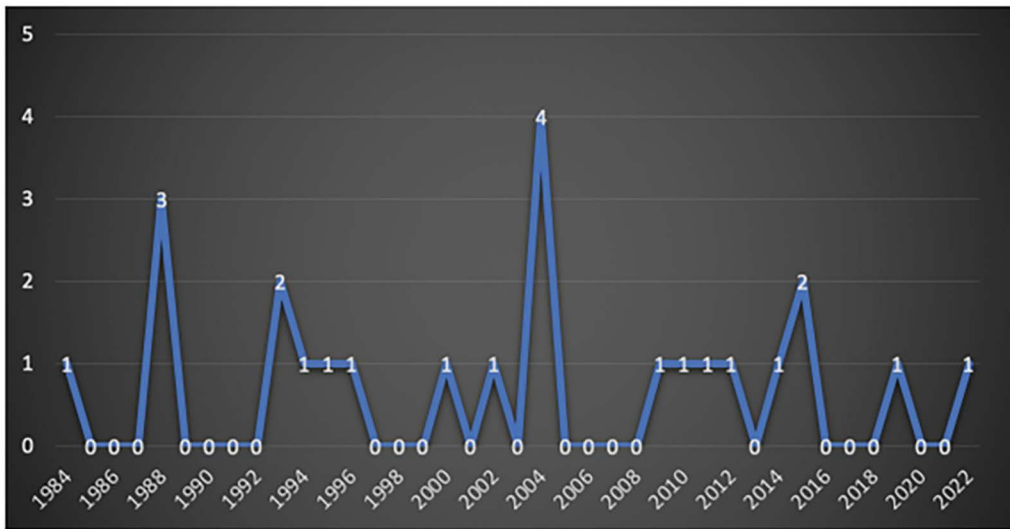
<sup>3</sup> Robert D. Newberry, “Latin American Countries with Space Programs: Colleagues or Competitors?” *Air & Space Power Journal* 17, no. 3 (Fall 2003): 39–45, <https://www.airuniversity.af.edu/>.

<sup>4</sup> National Institute for Space Research (INPE), “Sobre o CBERS,” 5 February 2018, <http://www.cbears.inpe.br/>.

<sup>5</sup> Cedê Silva, “Lula and Xi sign 15 agreements on trade, agriculture, new satellite,” *Brazilian Report*, 14 April 2023, <https://brazilian.report/>.

## Bilateral Agreements

From 1984 to 2022, Brazil and China have signed 24 bilateral diplomatic documents formalizing cooperation in the satellite sector. This article analyzes these bilateral instruments as the main source of data to explore the areas of cooperation, intentions, and common interests between Brazil and China. The types of agreements considered include one complementary adjustment of an agreement, three bilateral acts, two agreements, three protocols, six complementary protocols, five joint declarations, one memorandum of understanding, and three bilateral plans of action. The analyzed agreements have been signed in Portuguese, Mandarin, and English, but this analysis will focus on those signed in Portuguese, which are available on the website of the Brazilian Ministry of Foreign Affairs.<sup>6</sup>



Source: Author's own compilation, based on data from Brazilian Foreign Affairs Ministry.

**Figure 1. Bilateral agreements between Brazil and China in the satellite sector**

The following is a summary of the content of the 24 bilateral agreements signed between Brazil and China in the satellite sector, considering the institutions involved, the nexus between civilian and military institutions, and the hierarchy of the officials signing the agreements.

Over time, the institutions involved in carrying out the bilateral cooperation between Brazil and China have been multiple and have changed, mainly on the Chinese side due to restructuring. The main Brazilian institutions involved have

<sup>6</sup> Ministério das Relações Exteriores, Government of Brazil, "Pesquisa Avançada," 2023, <https://concordia.itamaraty.gov.br/>.

been the National Institute for Space Research (INPE) and the Brazilian Space Agency (AEB). Additionally, the COSBAN established the China-Brazil Space Cooperation Subcommittee, which includes the working group of China-Brazil Ten-year Space Cooperation Plan and the China-Brazil Earth Resources Satellite Cooperation Joint Project Committee.<sup>7</sup>

One notable difference between Brazilian and Chinese institutions participating in this cooperation is that the Chinese institutions are directly linked to the defense sector. While presented as civilian institutions, their primary function is to provide equipment, services, and so forth to the military forces. For instance, this is the case of the State Administration of Science, Technology, and Industry for National Defense (SASTIND)<sup>8</sup>

**Table 1. Institutions in charge of the execution of the agreements**

Country	Institution
Brazil	National Institute for Space Research
	Brazilian Space Agency
	Ministry of Science and Technology
	Ministry of Defense
China	China Academy of Space Technology
	Ministry of Aerospace Industry
	China National Space Administration
	Commission for Science, Technology and Industry for National Defense
	State Administration of Science, Technology and Industry for National Defense

Source: Author's elaboration, based on information within the bilateral agreements.

Regarding the officials responsible for signing the bilateral agreements, the Brazilian side has mainly been represented by ministers of state, most of whom were the minister of foreign affairs. On the other hand, China has signed agreements through its ambassador to Brazil, director of the State Administration of Science, Technology and Industry for National Defense (SASTIND), and minis-

<sup>7</sup> The highest coordinating body of the Brazil-China Comprehensive Strategic Partnership.

<sup>8</sup> "State Administration of Science, Technology and Industry for National Defense (SASTIND) is under direct supervision of the Ministry of Industry and Information Technology (MIIT). Its predecessor is the Commission of Science, Technology and Industry for National Defense. . . . The major responsibilities of SASTIND involve the nuclear weapon, aerospace technology, aviation, armament, watercraft and electronic industries. It is established to strengthen military forces with additional personnel and more advanced equipment. Ensuring material supplies for the army is its top priority." State Council, People's Republic of China, "State Administration for Science, Technology and Industry for National Defense," 6 October 2014, <http://english.www.gov.cn/>.

ter of foreign affairs. It is important to highlight that cooperation between Brazil and China under the bilateral strategic partnership is at the highest level, as their respective vice presidents are responsible for COSBAN.

### **Possible Implications for US Interests**

The rapid development of China's space-related technology has raised concerns among US officials regarding the so-called "Three Cs": the contested, congested, and competitive use of space.<sup>9</sup> These three aspects pose challenges in three dimensions: military and strategic, operational, and commercial. For instance, in 2007, China tested an antisatellite system (ASAT) that destroyed an existing satellite, which surprised the United States due to the technology that China has developed and the significant amount of debris produced as a result of the collision. Washington is also concerned about China's increasing engagement with emerging spacefaring nations in pursuit of commercial space ambitions, which US observers and policy makers view as "a part of the more competitive nature of space."<sup>10</sup>

Some Latin American countries have made different decisions regarding satellite technology. For instance, some leftist governments in the region, such as Bolivia, Nicaragua, and Venezuela, have formed partnerships with China. Meanwhile, Argentina and Brazil have taken a more pragmatic approach when it comes to establishing commercial or cooperation agreements in the satellite sector. However, according to officials from Brazil's satellite agency, bilateral cooperation with China and the development of the CBERS program have allowed Brazil to become more self-sufficient in the field of satellite imagery and less reliant on the United States and Europe.<sup>11</sup> This has also enabled opened up the possibility of exporting imaging services to developing countries in Latin America and Africa.

There is still disagreement among analysts on how to interpret the spillover of strategic cooperation between China and Latin American countries in the satellite sector on international relations and great-power competition. While some predict that these joint space programs pose a threat to US national security,<sup>12</sup> others argue that Chinese–Latin American space cooperation is mainly driven by

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<sup>9</sup> For an accurate definition, see also, Theresa Hitchens, Joan Johnson-Freese, and James E. Cartwright. *Toward a New National Security Space Strategy: Time for a Strategic Rebalancing* (Washington, DC: Atlantic Council, 2016), 15–23, <http://www.jstor.org/>.

<sup>10</sup> United States–China Economic and Security Review Commission, *2011 Report to Congress* (Washington, DC: GPO, 2011), 219, <https://www.uscc.gov/>.

<sup>11</sup> INPE official, interview by the author, December 2012.

<sup>12</sup> R. Evan Ellis, "Advances in China-Latin America Space Cooperation," *China Brief* 10, no. 14 (9 July 2010), <https://revanellis.com/>.

national development interests and does not follow any global ambitions.<sup>13</sup> However, this article argues that while Brazil follows its national development interests, its cooperation with China in the satellite sector has direct and/or indirect implications for US interests.

In this article, the relationship between Brazil and China in the satellite sector is examined from the perspective of triangular relations, which suggests that foreign policy or actions in a bilateral relationship can directly or indirectly affect a third country. Brazil has pursued a pragmatic foreign policy that prioritizes its own national interests rather than a balancing strategy to support China's rise to global power.<sup>14</sup> However, cooperation with China in the satellite sector has implications for Brazil's relationship with the United States, as Brazil is part of a triangular relationship with both countries. Additionally, bilateral agreements between Brazil and China include clauses that may be interpreted as elements of contestation and competition, suggesting a certain alignment with China in this sector.

This article will now explore how bilateral cooperation between Brazil and China could potentially impact US interests, with a focus on the contestation and competition dimensions. It is worth noting that while the bilateral agreements between Brazil and China do not mention the United States specifically, there are certain elements that could be seen as contesting or competing with US interests.

### ***Contestation***

The term *contestation* is used in this article to refer to a country's efforts to limit or disrupt the adversary country's aerospace capabilities. This dimension includes not only military elements but also a strategic dimension. In the case of China, it is challenging US supremacy in the use of space through the development of ASAT weapons and the Beidou navigation satellite system, among others. This dimension also includes the formation of alliances or strategic partnerships. In the following, the article will analyze this last aspect by studying the partnership between China and Brazil in the satellite sector.

Brazil and China have established a comprehensive strategic partnership that covers all possible aspects of a bilateral relationship, including political, diplomatic, commercial, technological, cultural, military, and people-to-people exchanges. In their bilateral agreements, both countries highlight their shared global interests, such as promoting an alternative multilateralism and creating a multipo-

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<sup>13</sup> Laura M. Delgado-López, "Sino-Latin American Space Cooperation: A Smart Move," *Space Policy* 28, no. 1 (1 February 2012): 7–14. <https://doi.org/>.

<sup>14</sup> On the reasons why a country chooses to develop a national space program, see, Deganit Paikowsky, *The Power of the Space Club* (New York: Cambridge University Press, 2017).

lar world with a more equitable distribution of power. These global interests are mentioned in 9 out of the 24 documents related to satellite cooperation, which serves as an explicit element of contestation. This is part of China's strategic contestation and its active diplomacy seeking support from strategic partners.

The bilateral agreements signed between Brazil and China emphasize the peaceful applications of satellite science and technology and recognize the importance of using space for social, economic, and cultural development. While it is not surprising that there are no major explicit elements of contestation against the United States in the agreements, there are some elements that could be seen as pointing in that direction. The clauses related to information sharing, innovations, and the bilateral agreement on satellite cooperation in defense matters signed by both countries all contain elements of contestation.

These bilateral agreements require the prompt sharing of innovations or information with the other party and prohibit the sharing of information with third countries without express consent from both Brazil and China. This implies an implicit limitation to cooperation with third countries, which may have implications for countries outside of the bilateral relationship. While such clauses may be common in this type of bilateral agreements, it is important to consider their potential impact on third countries.

The satellite cooperation agreement on defense issues between Brazil and China is noteworthy, particularly considering Brazil's decision in 2013 to pursue dual-use satellites, including the construction of the Geostationary Strategic Defense and Communications Satellite-1 (SGDC). The project involved a contract with Thales Alenia Space, a partnership between Thales of France and Leonardo of Italy, along with Brazilian companies Telebras and Visiona, as well as Embraer Defense. Through this partnership, Thales Alenia Space is transferring technology to Embraer, which allows Brazil to strengthen its ties with China while also facilitating technology transfer with European partners.<sup>15</sup>

In July 2014, the Ministry of Defense of Brazil signed the Complementary Protocol to the Agreement on Cooperation in Defense Matters between the Brazil and China, in the areas of remote sensing, telecommunications and information technology, with the State Administration of Science, Technology and Industry for Defense. The agreement is also similar in structure and even in content to the bilateral defense cooperation agreement previously signed between Brazil and China on 12 April 2011. Although the agreement signed in 2014 is purely within the satellite sector and aimed at environmental protection and sovereignty

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<sup>15</sup> Peter B. de Selding, "Brazil Orders Civil-Military Telecommunications Satellite," *SpaceNews*, 29 November 2013, <https://spacenews.com/>.

of the Amazon, the analysis of satellite cooperation should be included as part of the cooperation established by both countries in the defense sector.

### **Competition**

Commercial competition for the use of space has intensified due to the increasing number of countries and players venturing into satellite technology, with the majority of satellites in orbit being for commercial use.<sup>16</sup> One example of this is the expansion of commercial satellite imagery into the investment sector, which raises questions about whether this trend will change the rules of international trade.<sup>17</sup> Currently, approximately 80 countries have registered at least one satellite in orbit. China has emerged as a significant player in the satellite industry, becoming a major competitor to the United States in the commercial satellite sector.<sup>18</sup> China's diplomacy has played a crucial role in the commercial satellite arena, as it has signed commercial agreements for the sale of satellites and established cooperation agreements, particularly with countries in the Global South.

The bilateral agreements signed by Brazil and China contain certain clauses that may have implications for commercial interests in the satellite sector, including those of the United States. These implications are related to the commercialization of satellite imagery, inclusion of priority clauses for the provision of parts and services, handling and confidentiality of data, exclusivity of launch services, and development of the satellite industry.

One aspect of the agreements is the inclusion of priority clauses granted to the counterpart for the provision of contracts for the sale of parts, services, and so forth. For instance, for the production of the satellites CBERS-3 and CBERS-4, Brazil and China agreed that each is responsible for a percentage of the construction of the satellites, but the other party has the priority in the sale of parts or services if one of them does not have the capacity to develop it. This is, in practice, a significant limitation on the purchase of inputs from third parties. For example, in the Supplementary Protocol on the Joint Development of Earth Resource Sat-

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<sup>16</sup> See, Irina Liu, et al., "Evaluation of China's Commercial Space Sector," *Institute for Defense Analyses*, 1 September 2019; Eric Tegler, "The Commercial Satellite Industry Is Increasing Awareness In Space But It's Not Changing Behavior Yet," *Forbes*, 17 December 2021, <https://www.forbes.com/>; and OECD, *OECD Handbook on Measuring the Space Economy*, 2nd ed. (Paris: OECD Publishing, 2022), <https://doi.org/>.

<sup>17</sup> Kolemman Lutz, "How Satellite Imagery is Revolutionizing the Way we Invest," *Medium* (blog), 31 December 2018, <https://kolemannlutz.medium.com/>; and Frank Partnoy, "Stock Picks From Space," *The Atlantic*, May 2019, <https://www.theatlantic.com/>.

<sup>18</sup> Kari A. Bingen, "Launching Into the State of the Marketplace," *Statement before the House Energy and Commerce Subcommittee on Communications and Technology*, 2 February 2023, <https://csis-website-prod.s3.amazonaws.com/>.

ellites of 27 November 2002, Article 10 states, “Should either Party need to procure services, parts, components or equipment under its responsibility to complete its obligations under the Cooperation Project, priority for provision of such items will be given to companies or institutions of the other Party, appropriately certified by the procuring Party. Specific contracts will be signed for this purpose.”<sup>19</sup> This type of clause is present in several of the bilateral agreements.

The sharing of information and innovations is an aspect that falls under both the contest and competition dimensions. Additionally, there is a clause prohibiting the sharing of information with third parties. Another aspect of the agreements between Brazil and China is the distribution of CBERS products to other countries, along with the development of CBERS data-application software and products for end users. Technical training on CBERS data applications is also conducted for users in both countries as well as other countries. However, the prices of imagery to be sold in other countries must be jointly agreed upon by Brazil and China. Only for the distribution of imagery domestically can each country specify the price. If this is a common practice in China’s satellite partnerships, it could have implications for US companies.

In terms of launch services, Brazil and China have agreed to give reciprocal priority to each other, although Brazil currently lacks the capability to launch satellites. Interestingly, for the launch of the CBERS-4 satellite, Brazil was designated as responsible for the launch, but China was granted priority to take on this responsibility in case Brazil was unable to do so.

Finally, the development of the satellite industry is a key reference in the bilateral agreements, with 16 out of 24 documents mentioning it. This encompasses not only the development of satellites but also all aspects related to satellite construction, data utilization, innovation, and more.

## **Final Considerations**

The implications of bilateral satellite cooperation between Brazil and China for the United States are more apparent in the dimension of competition than in that of contestation. The implicit aspects of contestation within the bilateral agreements include the global approach and the explicit prohibition of cooperation with third countries. On the other hand, the bilateral agreements have several

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<sup>19</sup> “Supplementary Protocol to the Framework Agreement between the Government of the Federative Republic of Brazil and the Government of the People’s Republic of China on Cooperation in the Peaceful Applications of Outer Space Science and Technology for the continued Joint Development of Earth Resource Satellites,” signed 27 November 2002 in Brasilia.

elements in the competition dimension, which imply various consequences for US commercial interests.

While using bilateral agreements as the only source of data is not sufficient to fully quantify the implications, it does provide a solid initial basis for analyzing the triangulation between Brazil, China, and the United States. The case study should be expanded to other strategic partners of China to determine if the contents of the bilateral agreements signed by China in the satellite sector have similar or new elements of contestation and competition. 🌐

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