Brazil-Russia Military-Technical Cooperation

A Fruit of the Post-Cold War World Order

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In the evolution of human civilization, the necessity for cooperation among groups to produce coalitions for mutual benefit has been a constant. However, the character of such cooperation, the variety of forms such cooperation takes, and the many differing end states stemming from cooperation among groups have always depended on a wide variety of internal and external factors with interlacing influences from both the past and present linked to influences anticipated from the future.

Assuming the existence of an underlying human imperative for employing cooperation between groups to achieve success in obtaining mutual ends, in this article, I will briefly examine the gradual emergence of the de facto "strategic and technological alliance" that exists between Russia and Brazil. In doing so, I will identify and highlight relevant events leading to the current cooperative relationship as much as the constraints of an article-length treatment allow. In developing this analysis, I have assumed that the basis and purpose for each country's interest in the other is not friendship but a desire of each to increase its own power to protect its political and economic interests.[1]

Background

I begin by providing a brief chronological overview of cooperation between the two nations followed by a more detailed description of salient events with analysis of the benefits derived from such instances of cooperation as they apply principally to the enhancement of Brazil's military power:[2]

- 1828: Russia and Brazil formalize diplomatic relations[3]
- 1828–1993: A low level of relations, mostly in commerce; interrupted during the Cold War until about 1991, after the end of the military regime in Brazil and the fall of the Soviet Union
- 1994–present: Cooperation becomes strategic—in political, military, and technical areas—but results do not meet declared purposes

Previous page: Brazilian astronaut Marcos Pontes takes part in zero-gravity training 13 February 2006 aboard a plane flying near Moscow. Pontes blasted off from the Baikonur Cosmodrome in Kazakhstan on 30 March 2006 with Russian cosmonaut Pavel Vinogradov and U.S. astronaut Jeffrey Williams. He spent eight days on the International Space Station before returning to Earth with the outgoing two-man crew. (Photo from the Associated Press)

Setting aside the many non-security-related initiatives focused on building better relations and cooperation during the epochs noted above, this article focuses on the development of military-technical cooperation between the two countries from the early 1990s through today. What has been set aside includes dialogue in a multilateral context in formal organizations such as Brazil, Russia, India, China, and South Africa (BRICS), the Group of 20 (or the G20, an international forum for the government and central bank governors of nineteen nations and the European Union), and the UN.[4]

However, while not analyzed here, it is important to note that Brazil and Russia have offered each other support in many areas of mutual interest outside of military-technical cooperation. For example, Russia has supported Brazil's quest to obtain a permanent seat on the UN Security Council, while Brazil has facilitated dialogue between Russia and members of Mercosur (a South American trade bloc established by the Treaty of Asunción in 1991 and Protocol of Ouro Preto in 1994). Brazil also passionately supported Russia's draft agreement posed at the UN to ban the deployment of weapons in space. Additionally, Russia and Brazil have old and strong bilateral commercial relations; for example, Russia is one of the largest importers of Brazilian beef.

History of Bilateral Relations between Brazil and Russia in the Military-Technical Domain

The increased emphasis on military-technical cooperation between Brazil and Russia was first raised formally in 1992 by Georgy E. Mamedov, the deputy chancellor of Russia. After a meeting between Mamedov and the Brazilian ambassador to Moscow, Sebastião do Rego Barros, Barros noted in a follow-up confidential telegram, "I think I can say that I see a Russian effort that has not been demonstrated yet in the development of relations with our country."[5] From 1992 to 1994, several rapport-focused events occurred across government entities that demonstrated Russian interest in Brazil:

- A Russian trade delegation visited Brazil and proposed, among other things, the opening of a Yak airplane assembly plant in Rio Grande do Sul (in southern Brazil).[6]
- A Brazilian mission to Russia caused disappointment on the Russian side because no Brazilian representative of the Department of Aerospace

The Sazhen-TM-BIS laser monitor station located on the campus of the University of Brasília in Brazil. Activated in 2013, it was the first such station built outside of Russia. The station was integrated into GLONASS (*Globalnaya Navigazionnaya Sputnikovaya Sistema*, or Global Navigation Satellite System), the global positioning network operated by the Russian Space Agency. (Photo courtesy of the Russian Federal Space Agency)

Science and Technology was included in the delegation. This was reportedly interpreted by the Russians as a "relative lack of interest from the Brazilian interlocutors during that event."[7]

- Subsequent confidential telegrams between the Brazilian Embassy in Moscow and the secretary of state in Brasília highlight additional Russian overtures for cooperation in the military-technical field as well as for the transfer of technology and the creation of joint ventures (i.e., observing the Missile Technology Control Regime).[8]
- Although Russia's 1993 Foreign Policy Concept mentioned Latin America as the last continent on Russia's list of priorities for engagement, it nonetheless nominated three states—Mexico, Argentina, and Brazil—as Latin American countries with which Russia would be interested in cooperating in areas like nuclear research, space exploration, and information technology.[9]
- Russia signed a contract in 1994 to provide Brazil the first set of Igla antiaircraft missile systems (followed by three more sales).[10]

These events mark a transition from rhetorical optimism to a concerted, tangible effort to develop military-technical relations. And while there were subsequent crises and delays across the next decade, they contributed to the increased technology alliance seen in the last seven years.

In 1997, Brazil's establishment of a High Level Cooperation Committee with Russia advanced the proposal for cooperation in technical-scientific fields, including in the nuclear and space sectors. This culminated at the end of the same year with the signing of the *Agreement on Technical and Scientific Cooperation* and the *Agreement Concerning Cooperation in Outer Space Sector for Peaceful Purposes*. After a meeting in 2002 between the Brazilian and Russian presidents, a joint declaration established the promotion of bilateral cooperation on the level of a long-term strategic partnership and the signing of a memorandum on military-technical cooperation.[11]

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Later, Russia's cooperation with Brazil ironically received a significant boost following an accident at the Brazilian orbital launch center, Centro de Lançamento de Alcântara (Alcântara Launch Center). In August 2003, three days before its scheduled launching, the VLS-1 satellite launch vehicle (Veículo Lançador de Satélites) exploded on the ground.[12] Russia responded by offering to lend its expertise in rocketry to help investigate the causes of the accident. The Russian team arrived in Brazil coincidentally during negotiations for an agreement between the Ministries of Defense, and Science and Technology of the two states. The same year, Russia and Brazil signed a basic agreement on military technology and transfer. The revision document of the VLS-1 subsequently led to a series of changes to the VLS-1 rocket model and supporting launch tower.[13]

Later, in 2004, a consortium of Russian companies opened a company in Brazil to launch satellites from Brazil's Alcântara Launch Center and for the development of rockets of different sizes, starting with VLS, with its first launch by 2008.[14] This proposal was made through official channels in February 2004. Investors spent approximately $2.5 million on this project until April 2004, although there was no official guarantee or technology safeguards agreement.[15]

At the end of 2004, a seminal event in the relationship between the two countries occurred when Brazil hosted the first official visit of a Russian president to its shores. In the same year, a memorandum was signed between the Brazilian Ministry of Science, Technology, and Innovation, and the Russian Federal Space Agency on the cooperation program in space activities, which facilitated the development of VLS-1. After signing this memorandum, the Russian president stated that the most promising areas for further bilateral cooperation included the airline, energy, and space-building sectors.[16]

With some changes to the Brazilian version of the rocket, Russia and Brazil subsequently shared development of a new family of rockets and geostationary satellites as well as further development of the infrastructure of Alcântara Launch Center.[17]

In October 2005, the Russian and Brazilian presidents met in Moscow to sign an agreement on cooperation in space. The joint statement asserted

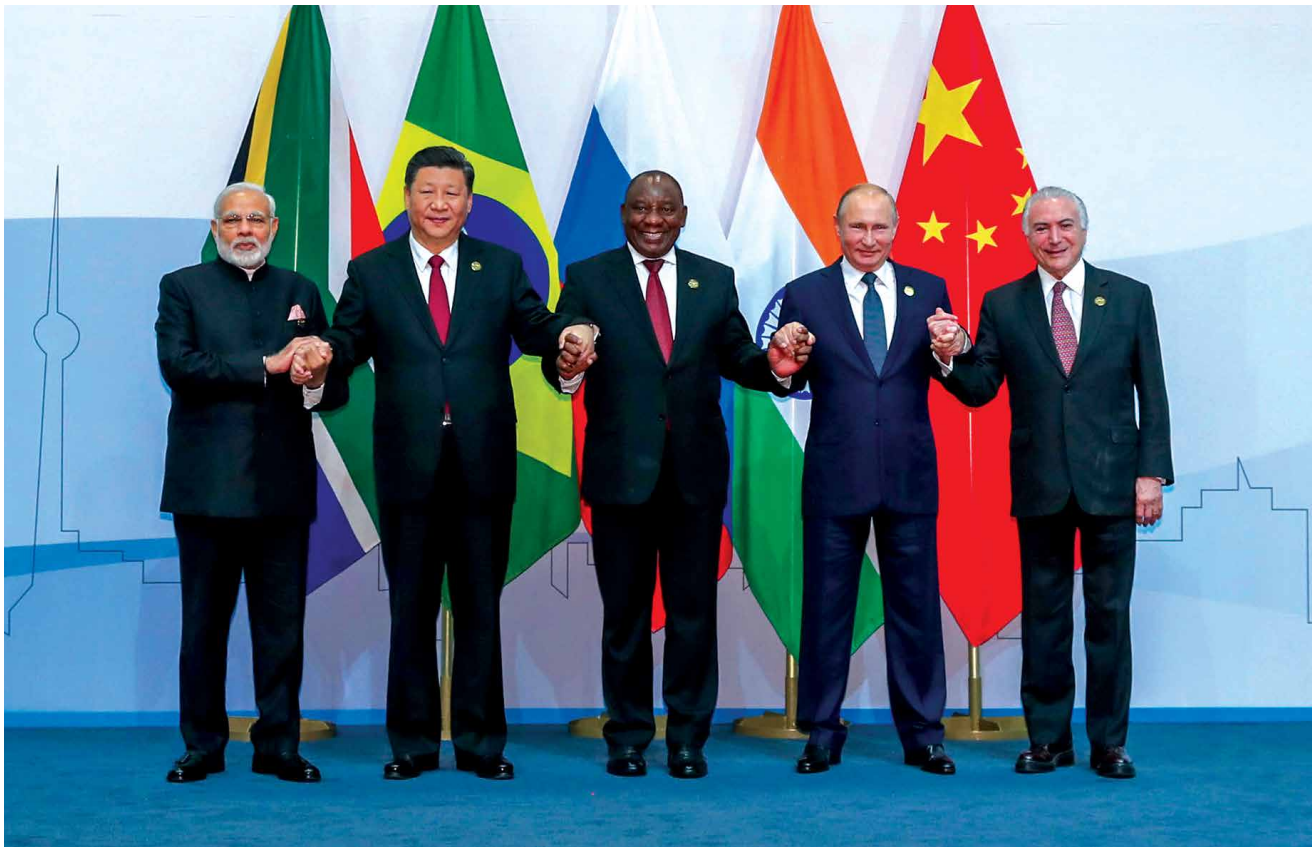
A mock-up of a Russian-built VLS-1 rocket is positioned in the mobile integration tower 13 July 2012 at the Alcântara Launch Center in the state of Maranhão, Brazil, in preparation for an actual rocket assembly. In 2005, the Brazilian government announced its intention to jointly develop with Russia five different closely related launch systems (including the VLS-1) based on Russian designs under the Southern Cross program. (Photo courtesy of the Brazilian Air Force)

the existence of a "strategic alliance" between the two states and the intention to explore the potential of other forms of military-technical cooperation.[18] According to the joint statement, the presidents of Russia and Brazil viewed favorably the entry of Russian Mi-171A helicopters and Be-103 seaplanes in the Brazilian market and the possible establishment of an Embraer's assembly plant in Russia.[19]

A week after the October 2005 meeting, the Brazilian government officially announced its ambitious Cruzeiro do Sul (Southern Cross) program. According to this agreement, Brazil would develop with Russia a five-rocket family, the smallest being further development of the VLS-1, with twenty-five changes recommended by the Russian State Rocket Center Makeyev Design Bureau.[20] This was done in connection with a first-ever contract to send a Brazilian astronaut to work on the International Space Station.[21]

In 2006, Marcos César Pontes—the only Brazilian astronaut to date—spent ten days in space with Russian cosmonauts, two days on board the Soyuz, and eight days on board the International Space Station. This mission has been an enormous source of national pride that provided great visibility of the Brazilian space program to the Brazilian people while promoting public support for Brazil's expanding relationship with Russia. The price that Brazil paid to Russia for this launch was $10 million, which was reportedly half the usual price Russia usually charged during that period.[22]

In 2007, the Brazilian government organized a tender for the acquisition of thirty-six aircraft for retrofitting and upgrading the Brazilian supersonic aircraft fleet (the FX-2 program), and Russia offered the Su-35 aircraft as a prospective item for sale. Although it was one of the favorites, the Brazilian Air Force (Força Aérea Brasileira) announced in 2008 that the Su-35 was out of the final selection process.[23] However, a year later, Brazil signed an agreement to offset the purchase (through commercial



(*Left to right*) Indian Prime Minister Narendra Modi, Chinese President Xi Jinping, South African President Cyril Ramaphosa, Russian President Vladimir Putin, and Brazilian President Michel Temer during the plenary session of the 10th BRICS (Brazil, Russia, India, China, South Africa) Summit 26 July 2018 in Johannesburg. (Photo by Xie Huanchi, Xinhua/Alamy Live News)

compensation) of twelve military Mi-35 helicopters worth about $150 million for the air force.[24]

In 2008, Brazil and Russia signed a defense technology cooperation agreement for the joint development of fifth-generation fighter jets and a satellite launcher as well as joint use of submarines, satellites, mapping systems, remote guiding technology, and information security.[25] In the same year, the spatial agencies of Brazil and Russia launched a program for cooperation in the use and development of the Russian Global Navigation Satellite System (GLONASS), the Russian equivalent to GPS.[26] One year later, within the limits of the signed technology protection agreement, Brazil and Russia ratified an elaboration of the pilot study of the VLS Alfa rocket (a modified version of VLS-1).[27]

Later, in 2010, as Brazil organized for the 2014 World Cup and the 2016 Olympics, the country bought armored Tigr vehicles from Russia to support security measures.[28] The following year, Gazprom (Russia's largest natural gas supplier) opened a representative office in Rio de Janeiro. Subsequently, Russian tycoon Igor Zyuzin created a binational company with the Pará Steel Plant (in Northern Brazil). Later, Rosoboronexport (Russia's Federal State Unitary Enterprise, the intermediary agency for Russia's exports/imports of defense-related and dual-use products, technologies, and services) began talks with the Brazilian government regarding upgrade and procurement of Brazilian police vehicles.[29]

In December 2012, after a state visit by Brazilian President Dilma Rousseff to Russia, Brazil signed an agreement to buy Russian antiaircraft systems in February 2013. In conjunction, the state-owned Russian Technologies State Corporation (Rostec) and the Brazilian Odebrecht Defense and Technology *(Odebrecht Defesa e Tecnologia)* signed a memorandum on technical cooperation committing to establishment of a joint venture for production of helicopters, air defense weapons, naval vehicles, etc.[30] These included signed agreements on the creation of a joint enterprise in Brazil for assembling the Russian-made Mi-171 family helicopters, establishing a service center for Mi-35M

helicopters, and developing an integrated air defense system on behalf of the Brazilian armed forces.[31]

The head of the Brazilian armed forces delegation, Gen. José Carlos de Nardi, said on that occasion that it was negotiating Brazil's acquisition of two batteries of Igla-S (Needle) portable air defense systems and three Pantsir-C1, which would include receiving both the technology and the right to build a factory for their assembly in Brazil.[32] Almaz-Antey, a Russian state-owned company in the arms industry, proposed a project through which Brazil's air defense system would be divided into five parts, using only Russian armaments. Proposed arms included S-300 missiles and modified versions of the Buk and Tor air defense systems.[33] In 2012, Almaz-Antey began talks with Brazil on bilateral cooperation for security support to the World Cup, then planned for 2014 in Brazil and 2018 in Russia, and the Olympic Games scheduled to take place in winter 2014 in Russia and summer 2016 in Brazil. Subsequently, the Brazilian Atlas airline company bought seven Ka-62 helicopters at the end of that year.[34]

In 2013, Dmitry Shugaev, general manager and deputy of Russia's Rostec (established in late 2007 to consolidate strategically important companies) and the head of the Russian delegation at the 2013 Latin America Aero and Defence Security Conference in Rio de Janeiro, spoke about the technology alliance with Brazil (referring to Odebrecht and its high-tech subsidiary, Mectron) and the Brazilian firm Marcopolo, which produces buses in Russia together with Kamaz (a Russian truck and engine manufacturer), as well as the implementation of the facial recognition system in Brazil for the World Cup and the Olympics.[35]

In the same year, Sergei Shoigu, the Russian defense minister, went on a formal visit to Brazil to close a sale of missile systems worth about $1 billion.[36]

Also that same year, the Sazhen-TM-BIS laser station (the first of its kind built outside of Russia) was installed at the Brasília University located in the Brazilian capital. This system is part of GLONASS.[37] A second system was installed the following year.[38]

As a result of the tensions over claims against of U.S. espionage conducted against the Brazilian president's personal emails, Brazil became very interested in cyber defense systems.[39] Russia, in turn, as a result of the embargoes against it by the international community following its annexation of the Crimean Peninsula and concerns related to the increasing U.S. influence in Europe due to military deployments to NATO countries on Russia's borders, became more interested in cooperation with Brazil in a range of high-tech security areas.[40]

In 2015, following the expression of Brazil's interest in upgrading its nuclear power plant following the 2011 earthquake and tsunami that released radioactive materials at Fukushima in Japan, Rosatom (Russia's state-run nuclear energy corporation) opened an office in Rio de Janeiro next to the Brazilian company Eletronuclear in 2015.[41] Rosoboronexport announced its intention to export Su-35 fighters to Brazil, including technology transfer—although this company had previously declined such a transfer in 2008.[42]

Earlier, in mid-2014, representatives of the Brazilian armed forces participated as observers to the Russian armed forces exercises (exercises adapted to the Brazilian requirements) at the Russian Defense Ministry's Tula Training Camp (two hundred kilometers from Moscow). Part of these exercises included tracking the real-time use of the Pantsir-S1 systems.[43] This was followed by nine days of analysis in anticipation of entering into the contractual phase for the acquisition of three systems.[44] The purpose of this acquisition was to protect Brazilian civilian and military strategic infrastructure.[45]

With the inauguration of Sazhen-TM-BIS (GLONASS equipment), Brazil and Russia signed an agreement to install other stations at the Federal University of Santa Maria (Rio Grande do Sul) and the Pernambuco Technological Institute (north of the country).[46] Later, at the São Paulo Latino American LABACE (Brazilian trade show) Conference and Exhibition 2014, the Helipark Taxi Aereo Service Center was authorized use of Ka-32 helicopters together with training and technical support to their Brazilian colleagues provided by their Russian partners.[47] Toward the end of 2014, a Russian delegation visited Brazil to see the "operational part of the Brazilian airspace defense and antiaircraft defense systems.[48]

In 2015, Rostec declared its intentions to continue its strategic partnership with Brazil by using intelligent Safe City and E-Government systems, and providing air defense weapons and civilian and military dual-use helicopters.[49] As a consequence, Mi-35M and Mi-17 helicopters were delivered to Brazil for civilian use, which prompted the Brazilian government to express interest in acquiring the Ka-62.[50]

That same year, the Brazilian minister of science, technology, innovation, and communication, Aldo

Rebelo, and the Brazilian Space Agency president, José Raimundo Braga Coelho, made an official visit to Russia to expand bilateral cooperation in the fields of their respective institutions. One of the topics discussed was the expansion of GLONASS calibration stations. Another topic was the installation of a Russian station for monitoring the space debris in Itajubá (Minas Gerais).[51]

Also discussed was a future exchange between the specialists of the Skolkovo Technology Park (in Russia, under construction) and Brazil's São José dos Campos (São Paulo) technological parks.[52]

In an interview with Brazil's *Tecnologia e Defesa* magazine on 2 June 2015, Sergei Goreslavskiy, deputy general manager of Rosoboronexport, said that the company was promoting the Podsolnukh-E radar system in Brazil, which could be integrated into the maritime area control system, a very relevant issue given the great length of the Brazilian coast. He also discussed plans for the development of SisGAAz Coastal Infrastructure as well as the sale of Yak-130 aircraft and Kornet-E missile systems.[53]

At the BRICS Summit in 2015, Brazil's Rousseff took the opportunity to announce that Brazil was interested in further partnering with Russia in atomic energy development, satellite launches, rocket construction, and Russian involvement in Brazil's Aster mission—the first Brazilian deep space, multi-institutional project to build a small space probe to explore asteroid 2001SN263 between Mars and Jupiter.[54]

Soon after this meeting, Brazil decided to acquire the Pantsir S1 surface-to-air system as the medium-altitude missile of the Brazilian armed forces. The decision was communicated to Russian Prime Minister Dmitri Medvedev by the Brazilian Vice President Michel Temer (president after Rousseff's dismissal) at the seventh meeting of the Russian-Brazilian High Level Cooperation Committee in Moscow, 16 September 2015. According to the negotiations, the sale would include 100 percent "technology transfer, allowing the production of 100 percent Brazilian national systems within six years after signing the contract." The total cost of the package was estimated at $1 billion, to be made through trade compensation. The Russian side said that if it is in Brazil's interest, Russia could "offer more economic packages with less technology transfer but more suited to the economic crisis in Brazil."[55]

Also in 2015, Brazil said it would implement a recent Russian innovation to protect companies against cyberattacks. Sanepar, a state-owned company, was the first Brazilian company to benefit from the implementation of this Russian innovation.[56]

In the same year, on 16 September, the Brazil-Russia Intergovernmental Commission signed a cooperation agreement between Nuclebrás Equipamentos Pesados S. A. and Rosatom América Latina for the construction of a Brazilian nuclear reactor for peaceful uses.[57]

On 27 January 2016, Brazil received a set of Russian missile systems—Igla-S short-range missiles, also known as man-portable air defense systems. These were delivered to antiaircraft artillery units across the country. The Igla-S can be used "both in urban areas and in uninhabited areas such as the Amazon forest, mainly when using radars such as the SABER M-60 and BRADAR, integrated with antiaircraft artillery."[58]

That same year, Ivan Dybov, deputy president of Rosatom, suggested that Russia "might build a radioactive waste repository for the company Electronuclear (a company operating the Angra I and II plants)" in Brazil.[59] Additionally, there were inaugurations for the third and fourth stations for the improvement of the satellite location of GLONASS," at the Pernambuco Technological Institute and the Federal University of Santa Maria.[60]

In June 2017, Brazilian President Michel Temer visited Russia, emphasizing that the purpose of the visit was "to encourage Russian investors to invest in various sectors of the Brazilian economy."[61] He noted that there were over fifty sectors, including energy, oil, and gas, which potentially could be of economic interest to Russia.[62]

Analyzing the Technical-Military Cooperation between Brazil and Russia from Other Perspectives

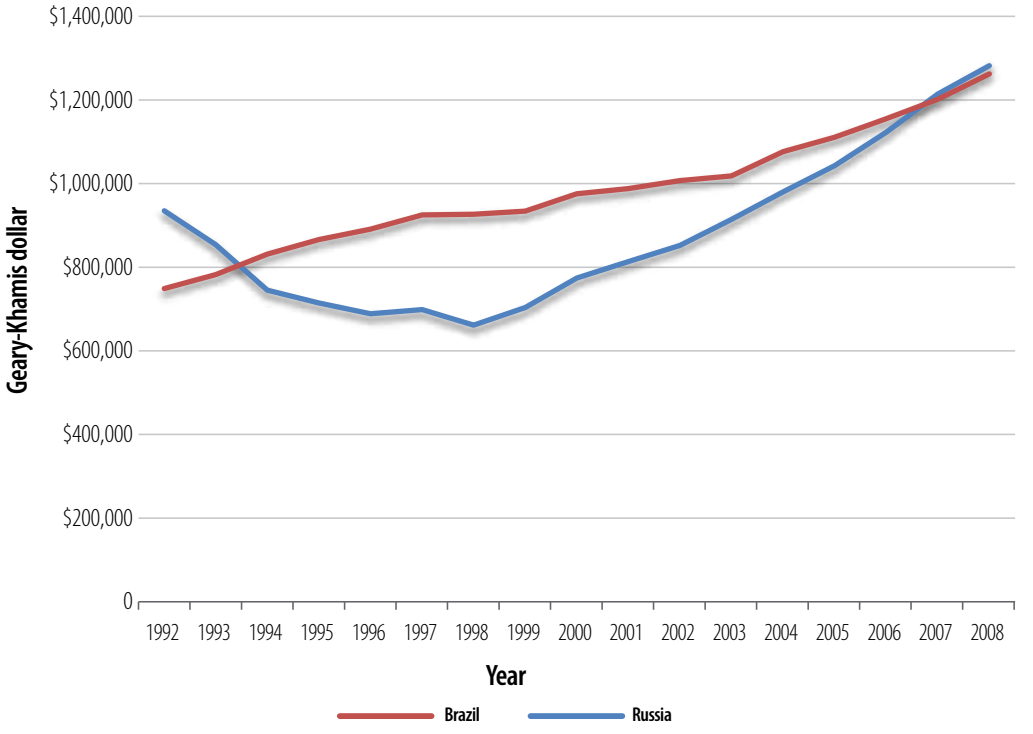
To summarize the development and current state of bilateral military-technical cooperation between Brazil and Russia, the two graphs illuminate the precedence that each of the two countries gives to their own nations' military sectors. Figure 1 (on page 75) reflects the gross domestic product (GDP) of the two countries, and figure 2 (on page 75) reflects their respective military expenditures since the beginning of the military-technical cooperation between Brazil and Russia.[63]

The figures show that, while Russia's GDP was generally less than Brazil's, its military spending was higher with a single exception. To complete the data, as a percentage of GDP, between 1992 and 2016, Brazil spent a minimum of 1.39 percent in 2016 and a maximum of

2 percent in 1991, 1994 and 2001, while Russia spent a minimum of 3 percent in 1998 and a maximum of 5.39 percent in 2016. The comparison implies that Russia is more focused on increasing its military power, while military power is not a priority of Brazil's politics.

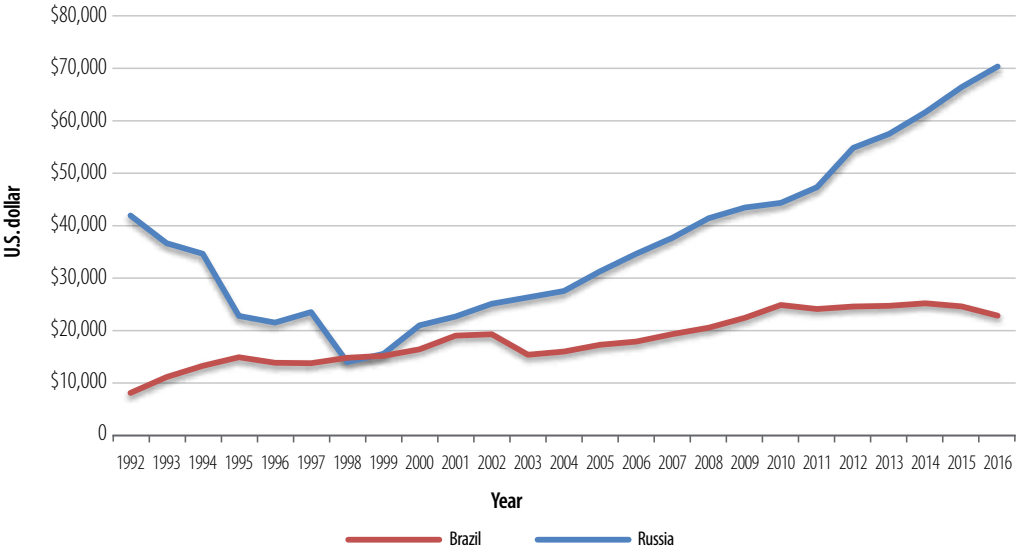
Conclusion

University of Chicago professor John J. Mearsheimer has argued that it is often difficult for states to cooperate and especially difficult for that cooperation to evolve when two factors inhibit it. The first is mistrust if there is a perception of possible fraud by one of the partners. The other refers to the cost/benefit advantage that states generally seek when contemplating cooperation as they compare what they are investing as opposed to what they are gaining in a partnership. Mearsheimer shows that great powers are often reluctant to cooperate, particularly in the military sector, because of the fear that



(Figure by author, data from Maddison Project Database and the World Bank; The Geary–Khamis dollar, more commonly known as the international dollar, is a hypothetical unit of currency that has the same purchasing power parity that the U.S. dollar had in the United States at a given point in time.)

Figure 1. Gross Domestic Product Million 1990 International Geary-Khamis (GK) Dollars



(Figure by author, data from the World Bank)

Figure 2. Brazil and Russia Military Expenditure in Constant 2015 U.S. Dollars

Lt. Col. João Ricardo da Cunha Croce Lopes poses with Russian cadets to whom he was teaching Portuguese in 2017. The Brazilian army has an agreement to send an officer to teach Portuguese to students training at the Military University of Moscow in an effort to cultivate better relations and cross-cultural understanding, and Croce was the second officer selected to serve under this program. (Photo by Lt. Col. Croce Lopes/courtesy of Centro de Comunicação Social do Exército [CComSEx/EB])

cooperation may lead to the transfer of technological advantages associated with modern weapons that could foster rapid changes in the balance of power, creating stresses that no level of cooperation can eliminate due to the dominant logic of security competition.[64]

From such a perspective, in the special relationship that has emerged between the two countries, "the geographical distance between Brazil and Russia … decreases the mutual preoccupation regarding their security, and this fact allows more confidence between [them]."[65] In other words, since Brazil and Russia are so geographically distant from each other, neither poses a direct threat to the other irrespective of their advances in military capabilities. This appears to have been a major favorable factor that promoted both less concern for fraud in their relationships and greater trust in pursuing mutually beneficial relationships.

In 2014, Konstantin Sivkov, president of the Russian Academy of Geopolitical Problems, said, "Any economic alliance will inevitably turn into a military and political one for one simple reason: once close economic cooperation begins between two countries, the question of protection of their interests immediately arises."[66] The cooperation between Brazil and Russia can be characterized as very promising for both states, and through it, each one of the two countries seeks to increase its power. At the same time, the cooperation is heavily affected by the national priorities and the consequence of the technological gap between the two states: while Brazil aims to obtain know-how in the field of military equipment and has always insisted on the transfer of technology (facilitating Brazil's aspirations to gain a place among the select club of great powers), Russia on the other hand views Brazil as

primarily a customer and aims to sell Brazil services and finished products using as capital its acquired military expertise.[67] It is stated that "the technology transfer rate between states and firms is very low, having, historically speaking, the predominance of the 'black box' spirit."[68]

From both historical and geopolitical perspectives, Russia and Brazil are not traditional partners. Each of the two states has always prioritized relations with other states in accordance with its own interests, and most of those interests have for each of them been mainly regional. So the current level of cooperation ought to be seen through the lens of the period in which it took place, namely in the post-Cold War period, often described as a period of unipolar hegemony dominated by the United States, in which both Russia and Brazil share a common interest in challenging such hegemony by fostering through strategic partnerships global multipolarity, with each of them vying for a role as one of the poles.[69]

We cannot yet draw conclusions about the effects of the political instability in Brazil on its relationship with Russia following the impeachment of Rousseff and during Temer's tenure. Nor can we gauge the gnawing influence of Brazilian corruption at the highest levels on the one side or continuing influence of broad sanctions imposed on Russia due to its actions on the Crimean Peninsula.[70] One result of the latter concern is that the sanctions on Russia, mainly applied by the United States and Europe, are placing a great deal of stress on relevant Russian business deals affecting Brazil. As a consequence, "both [countries] are dealing with a serious political crisis, and corruption is endemic in the system; … inflation is coming down in both countries, and so are interest rates."[71]

In 2018, presidential elections took place both in Russia and Brazil. The priorities of each country remain the same, and they are not concerned with each other. However, history has taught us that the world of politics can have a plot twist at any time. Also, we have to take into account that, in this turbulent period for international politics, the usually similar positions of Russia and Brazil within relevant international organizations might have an increased importance for both countries. However, since this article has shown that this cooperation was the result of changes in the post-Cold War international system, we can expect it to continue in the same pattern as long as there are no major changes in the balance of power in the current system of international politics. ■

A basic version of this article (in Romanian), titled "Cooperarea tehnico-militară dintre Brazilia și Rusia: aspirații post-Război Rece," was originally published in Monitor Strategic *(3-4/2016), 51–62.*

Notes

1. This is a main principle of political realism theory.

2. As it is characterized in "Russian Federation," Ministry of Foreign Affairs [of Brazil], accessed 6 September 2018, http://www.itamaraty.gov.br/en/ficha-pais/6573-russian-federation.

3. Ibid.

4. Ricardo Wegrzynovski, "União de dois gigantes – Nova parceria com a Federação da Rússia pode levar o Brasil ao topo da tecnologia de defesa [Union of two giants – New partnership with the Russian Federation may lead Brazil to the top of defense technology]," *Desafios do Desenvolvimento* Ano 5, Edição 43 (17 May 2008), accessed 30 May 2018, http://www.ipea.gov.br/desafios/index.php?option=com_content&view=article&id=1511:catid=28&Itemid=23. Referring to aerospace cooperation, Himilcon Carvalho, interim president and director of Spatial Policy and Strategic Investments of the Brazilian Space Agency, underlined that BRICS (Brazil, Russia, India, China, and South Africa) "strengthens as a technological development bloc." It is also worth mentioning that within the BRICS, cooperation has been developed over time in the fields of military, nuclear, and aerospace technology.

5. Bruno Mariotto Jubran, "Brasil e Rússia: Política, comércio, ciência e tecnologia entre 1992 e 2010 [Brazil and Russia: Policy, trade, science and technology between 1992 and 2010]" (master's thesis, Federal University of Rio Grande do Sul, 2012), 80.

6. Ibid., 85.

7. Ibid., 84.

8. Ibid., 85.

9. Andrei Melville and Tatiana Shakleina, *Russian Foreign Policy in Transition: Concepts and Realities*, in Vinícius Gurtler da Rosa, "Brasil e Rússia: uma parceria verdadeiramente estratégica? [Brazil and Russia: an actual strategic partnership?]" (master's thesis, University of Rio Grande do Sul, May 2014), 85.

10. "'Rosoboronexport' na LAAD 2011 – Defence & Security. Entrevista com o chefe da delegação da Rosoboronexport Serguei Ladiguin ['Rosoboronexport' at LAAD 2011 – Defense & Security. Interview with the head of the Rosoboronexport delegation Serguei Ladiguin]," DefesaNet, 30 March 2011, accessed 30 May 2018, http://www.defesanet.com.br/laad2011russia/noticia/142/%E2%80%9CRosoboronexport%E2%80%9D-na-LAAD-2011-%E2%80%93-Defence-&-Security/.

11. "At the End of Negotiations, President Vladimir Putin and President Cardoso of Brazil Signed a Joint Statement," Kremlin, 14 January 2002, accessed 30 May 2018, http://en.kremlin.ru/events/president/news/42469.

12. There were two attempts to launch the VLS rocket in 1997 and 1999, but the rockets blew up a few minutes after launch.

13. Nelson Jobim, "A Defesa e o Programa Espacial Brasileiro [Brazilian Defense and Space Program]," in *A Política Espacial Brasileira, Parte I* [Brazilian Space Policy, Part I], ed. Rodrigo Rollemberg, Cadernos de Altos Estudos Série no. 7 (Brasília, DF: Edições Câmara, Centro de Documentação e Informação, 2010), 96.

14. Salvador Nogueira, "Russos querem lançar satélites do Brasil [Russians want to launch satellites from Brazil]," *Folha de São Paulo* (website),

accessed 29 September 2018, https:// www1.folha.uol.com.br/fsp/ciencia/fe2605200401.htm. The Brazilian launch center, due to its geographical position, offers many advantages—including a lower launch cost due to substantially less fuel consumption compared to the launch centers used by Russia at that time. Currently, Russia launches missiles not only from its territory and from Kazakhstan but also from the launch center of the European Union in French Guiana, with similar advantages to Brazil. A Russian launch project was initiated in Christmas Island (Australia), but it has not been successfully completed. Russia is also part of the Sea Launch multinational (alongside Norway, the United States, and Ukraine), a Pacific Ocean launching center located on the equatorial line that launches Zenit rockets, produced collaboratively by Russia and Ukraine, but the tensions between the two countries in 2014 have left this base in a situation still uncertain. In April 2018, the Russian aviation group S7 completed the Sea Launch purchase; however, the Zenit rocket is not likely to be produced in the near future, and adapting the Soyuz-5 rockets for launch from this platform could take at least until 2022. For more information, see Caleb Henri, "S7 Closes Sea Launch Purchase, Future Rocket TBD," Spacenews, 17 April 2018, accessed 2 October 2018, https://spacenews.com/s7-closes-sea-launch-purchase-future-rocketbd/.

15. Nogueira, "Russos querem lançar satélites do Brasil."

16. "Russia Is Ready to Expand Its Long-term Cooperation with Brazil in High Technology and Science-intensive Fields," Kremlin, 22 November 2004, accessed 22 August 2018, http://en.kremlin.ru/events/president/news/32207.

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