

# DEFENSE INDUSTRY AND STRATEGIC AUTONOMY: THE POSITION OF BRAZIL AND COOPERATION IN DEFENSE IN SOUTH AMERICA

Héctor Luis Saint Pierre<sup>1</sup>

José Augusto Zague<sup>2</sup>

## ABSTRACT

---

The field of defense industry and technology limits the strategic autonomy of countries. In our study, we show how this axiom guided the investments in the sector during Dilma Rousseff's government, based on the coordinates proposed in the document called Estratégia Nacional de Defesa (National Defense Strategy – END). This document demands that the purchase of defense materials should be conditioned by technology transfer of the selling country to avoid or attenuate the dependence on external suppliers. However, both in local armaments production and in cooperation for the development of a South American defense industrial base, we believe that without the convergence among actors of the defense sector, companies, and research and development centers (civil and military), the document may only highlight good intentions and will be far from moving the country toward strategic autonomy.

**Keywords:** Defense Industry, Strategic Autonomy, Technology.

---

<sup>1</sup> Universidade Estadual Paulista (Unesp), São Paulo-SP, Brazil. hector.sp@ipprl.unesp.br

<sup>2</sup> San Tiago Dantas Graduate Program (Unesp, Unicamp, PUC-SP), São Paulo-SP, Brazil. pati.borelli@gmail.com

## DEFENSE INDUSTRY: THE BRAZILIAN CASE

A well-developed defense industry (DI), contemplating scientific and technological research associated with the national business community, is considered strategic for the autonomous formulation of the defense policy. A modern DI and a correlated scientific-technological park could significantly reduce the external strategic dependence on acquisition, maintenance, and modernization of defense materials (DM).

Independence of external suppliers broadens the autonomy in the deployment of means of defense, strengthens the dissuasive capacity, and increases the freedom of political decision. Nevertheless, there are some specific variables for the DI development, especially in the field of sensitive technology, which produce an effect that delimits the capacity to produce a very sophisticated DM for few countries that limit the decision-making capacity of dependent countries. How to have strategic autonomy in national and regional contexts of low investment in research and development (R&D), reduced internal and regional market, and with a cyclothymic defense policy?

DI is a sector that relies on the guidance, protection, and encouragement (including financial) of the State for its implementation and development, which requires a long period. It also requires a State involvement in: 1) financing or direct participation in R&D of products and acquisition of technology by cooperating with other States; 2) commitment to purchase the DM produced by DI; 3) availability of a government bureaucracy, especially in diplomatic channels, to encourage sales abroad; 4) creation of mechanisms to match production costs with competitive prices and public financing in foreign sales through credit for buyers; and 5) tax exemption to attract investments from private capital for the DI.

In Brazil, the implementation of R&D centers of technologies applied to the military field, considering the advancement of industrialization between 1950 and 1970, provided a State-induced production that gave rise to important companies that produce DM in the country. With state funding, a policy of benefits for private and state companies dedicated to the DM production was organized among R&D institutions linked to military organizations. The cornerstone of this model, the Centro Técnico Aeroespacial (Aerospace Technical Center – CTA), was founded in 1954. With the evolution in R&D within the Brazilian Air Force (from the Portuguese acronym, FAB), in 1969 the Empresa Brasileira de Aeronáutica

(Brazilian Aeronautical Company – EMBRAER) was created, and in the 1970s, R&D complexes of the Navy and the Air Force were substantially expanded (CONCA, 1997, p. 40). In the 1970s, the Army implemented an organizational model for the R&D activities that followed the institutional design developed two decades ago by FAB, which resulted in the Centro Tecnológico do Exército (Army's Technology Center – CTE<sub>x</sub>) (CONCA, 1997, p. 42).

During the 1970s the military regime consolidated a military-industrial policy, with a growth strategy led by the State, encouraging investment in the defense sector and ensuring a market for manufacturers. To put the military-industrial policy in practice, subsidies, fiscal incentives, State-funded R&D, acquisition policies for internally produced DM, and protection policies for the Brazilian market (CONCA, 1997, p. 88) were directly and indirectly used. The restrictions of the United States of America – main supplier of DM to Brazil – to obtain advanced technology or the acquisition of updated equipment increased immediately after the World War II. Such fact, on one hand, evidenced the difficulty in structuring a national defense system based on strategic dependence on defense technology and products from other countries; but, on the other hand, it allowed the development of national initiatives for starting the research and production of weapons with certain autonomy, but based mainly on providing means of defense for the Armed Forces (from the Portuguese acronym, FA). During the Brazilian military regime, the government introduced a policy to broaden the DM production. In this period, according to Buzan (1991, p. 72), “Brazil was among the nations determined to consolidate a broad-based armaments industry.” (Our translation)

However, the limitations to advanced technology did not prevent the expansion of the Brazilian DI in the 1970s. In one decade, Brazil, being strongly dependent on external suppliers, became an important armament exporter and a leader among the so-called “Third World” countries (CONCA, 1997, p. 1). Despite the initial dynamism of the sector, the Brazilian DM production was characterized by the low technology growth (BATTAGLINO, 2009, p. 88).

Although the production of DI in Brazil in the 1970s and 1980s had low incorporation of advanced technology, the country developed quite sophisticated weapon systems for local use and later for exporting to least economically developed countries and also for developed

countries (ABETTI; MALDIFASSI, 1994, p. 14). With the outbreak of the military conflict between Iran and Iraq, in the 1980s, there was an exponential increase in the arms sales, accounting for US\$600 million in 1987 (DAGNINO, 2010, p. 68). The increase in exports during the 1980s consolidated the idea that DI could overcome technological limitations to become more sophisticated.

However, the changing in the international scenario – with the end of the Cold War and the transition to democracy in South America, from 1980 to 1990 – altered the industrial model configuration and interrupted the generation of exportable balances. The strategic dependence regarding the USA made Brazil respect the restrictions imposed by the country to arms sales to the Middle East. Hence, the sales of weapons to this region, driven by the success of the Artillery Saturation Rocket System, were canceled, and exports declined sharply. The impact of strategic dependence on the balance of payments was clear: the balance generated by exports fell to a minimum value. In 1988 and 1989, revenues fell to US\$200 million, and in 1990, exports fell sharply and there was no record of sales abroad in this year (DAGNINO, 2010, p. 77).

Between the analysis of the rise and fall of the DI in Brazil, according to an interpretative line, the DM production followed a cyclical pattern of 15 years, considering the technological characteristics of armaments, which require an infrastructure for their continuous update and, moreover, according to this line of thought, for internal market saturation (ABETTI; MALDIFASSI, 1994, p. 231). Brazilian DI faced difficulties in offering products with more technological intensity and sophistication to the international market. This, apparently, in addition to insufficient technological capacity-building for the development and production, faced the pressure exerted by the USA to limit and control DM exports (DAGNINO, 2010, p. 69; emphasis added).

Another interpretative line questions the political aspects resulting from transformations generated by the end of military governments. With redemocratization, political forces that controlled the government lost influence on defense policies, undergoing changes in projects and programs, despite the progress achieved in the sector (CONCA, 1997, p. 246). Brazilian DI was resilient in the first four years of redemocratization and kept foreign sales in a high level until 1989 (DAGNINO, 2010, p. 77), which can be assigned to the civil government, which had in its structure elements linked to the military regime (O'DONNELL, 1988, p. 282) and

the permanence of a “military tutelage” of this government, especially on issues regarding the Defense Sector. If the technological outdateding and the discontinuity of projects had important influence on the Brazilian DI, the end of the Iran-Iraq War – in which Iraq bought Brazilian armaments and claimed part of the productive dynamics – was responsible for the disruption in the production pace. With the end of the production in the sector, the beginning of the 1990s marked the dismantling of the Brazilian DI (COSTA, 2005, p. 216).

The privileged position of the 1980s, when Brazil was among the main exporters of armaments in the world, led to the loss of dynamism for its strategic dependence. In the 1990s, DI lost its main manufacturer of armored vehicles, Engesa, and with the budgetary constraints of the FA and fall in exports, its production remained at a minimum level. The situation changed very little in the first decade of the 2000s. In 2012, the value of exports of weapon systems reached US\$36 million, with sales concentrated in a few products, such as the Artillery Saturation Rocket System II, of Avibras, and the EMB-314 Super Tucano light-attack aircraft, both originally developed in the 1980s (STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, 2013). The reduction of government orders due to budgetary constraints and the technological outdateding by the lack of investments in R&D limited the capacity of the Brazilian DI to fully develop its potential.

In 2005, the Brazilian government established the Política Nacional da Indústria de Defesa (National Defense Industry Policy – PNID) to strengthen the Base Industrial de Defesa (Defense Industrial Base – BID). To do so, the government of President Luiz Inácio Lula da Silva proposed the reduction of the tax burden and allocated incentives to technological improvement of strategic defense products (BRASIL, 2005). But only in 2008, with the Estratégia Nacional de Defesa (National Defense Strategy – END), the government classified important points for the modernization and restructuring of the DI such as the preference in the acquisition of DM of countries that transfer technology (BRASIL, 2008).

In this sense, through partnerships, Brazilian companies established partnership with their foreign counterparts to produce defense goods and services in the national territory. The goal of acquiring technology was to upgrade sectors of the Brazilian DI that lost relevance in the 1990s. Among the industrial companies providing MD for the Brazilian FA in 2010, 37% produced low-intensity technology products,

17% medium/low, 21% medium-high, and 25% high. These data represent the entire FA supply chain, including weapon systems, clothing products, armaments, ammunition and explosives, communication equipment, among others (SCHMIDT; ASSIS, 2013, p. 35-38). Most of the suppliers are still concentrated in products of low and medium-low intensity, which is corroborated by the reduced value of DM exports in the last years.

The diffusion of advanced military technology within the international system, according to Buzan, occurs due to three situations: 1. physical or political expansion of producer countries; 2. transfer of armaments from producing countries to non-producers; and 3. dissemination to other centers with the capacity to produce advanced technology. The first two assumptions are related to the supply of armaments of military powers to their allies. The physical and political expansion was effective until the World War II, and the transfer occurred through the international arms trade. The third assumption relates technology transfer from producing countries to other countries to the capacity to acquire knowledge through agreements for local production of armaments, as proposed by the END (BUZAN, 1991, p. 61).

The capacity to incorporate technology has a hierarchy determined by the scientific advancement of the country or group of countries that produce armaments. While the major DM-producing countries develop highly sophisticated armaments, countries such as Brazil concentrate knowledge on the DM production limited to low-intensity technology products.

Technology requires the growing nationalization of the manufacturing of components, accelerating technological, managerial, and industrial training, greater and more intense coordination between development centers and the productive sector, and ensuring continuity of programs when facing difficulties regarding government funding and international pressures (CAVAGNARI FILHO, 1996, p. 351). The technology employed in DI contemplates technical-scientific elements that can be implemented in the civil activity, which would result in economic benefits arising from the spin-off (HARTLEY, 2007, p. 9). Other authors, such as Renato Dagnino, consider this is a fallacious argument (DAGNINO, 2010, p. 9-100), as we will show further.

In Brazil, the scarcity of resources related to military R&D limits the spin-off generation in the civil sector. To illustrate a spin-off obtained by the Brazilian DI, we could mention the production program of the AMX

light fighter-bomber developed by Embraer with the Italian companies Aeritalia and Aermacchi (currently Alenia/Leonardo) in the 1980s, which also enabled Embraer to design and manufacture more sophisticated aircraft (FERREIRA, 2009, p. 170). The set of jet airliners produced by Embraer since the 1990s, which led the company to be the 3rd largest producer of commercial aircraft, has incorporated the Programa AMX (AMX Program) technology, in which it participated in the development of the software, composite materials, and part of the electronic system of the military aircraft, providing the “dual” development of technologies, thus allowing its civil deployment (CAVAGNARI FILHO, 1996, p. 14). Embraer’s tactical and refueling transport aircraft, KC-390, uses components and structures of the EMB 190 civil jet, which resulted from a project that received technology developed during the AMX Program (FERREIRA, 2009, p. 170). However, trying to replicate the success of the technology acquisition model developed by Embraer in the AMX Program does not guarantee similar results for all cases. The incorporation of advanced technologies into new generations of armaments makes technology transfer more and more costly.

The argument of the spin-off is often used to justify the increase in military expenditure. However, the idea of the positive economic impact produced by the spin-off, and its deployment in civil industry, has been increasingly questioned by researchers and economists. The positive impact was greater immediately after the World War II, period in which the State funded research within the military field that resulted in gains for the industry. Nowadays, however, the predominant idea among researchers of the sector is that, if there is any technological incidence between the civil and the military industrial sector, it takes place in the reverse direction than previously thought. There seems to be a consensus that the generation of “spin-in” from the civil to the military sector is more important and frequent than the spin-off (DAGNINO, 2010, p. 9-10).

Despite the limited budget for the Defense R&D, some FA research centers, such as the Army’s Technology Center (CTEx), have reasonable capacity to develop DM that, if it does not deploy leading-edge technology, at least contributes to DI for locally producing part of the DM. of the military research centers are scarce to the civil industry, aggravated by the “culture of secrecy,” the “spin-in” is hindered by the lack of coordination between the DI, Brazilian companies, the academia, and research centers.

With the END, DM acquisition started complying with a protocol

by which the purchases must be preceded by a detailed analysis, which grants preference to companies providing industrial, commercial, and technology transfer countervailing measures. The measures may include industrial coproduction, national production under license, and technology transfer. However, the prediction was that, in the 2014-2017 period, expenditures on DM acquisition would reach 11.7% of the budget for the Ministry of Defense, and only 0.9% would be allocated to military R&D expenditures, indispensable for the acquisition and/or development of new technologies. In a comparative study carried out on 68 countries, the average of expenditures on DM acquisition accounted for 18.1%, and on military R&D, 2.4% (SCHMIDT; ASSIS, 2013, p. 58-59).

As an additional difficulty, military technologies are enshrined by a secret based on the national security of the producing country, which prevents its transfer to other countries and that, on the other hand, are difficult to develop and to obtain because of the DI of the receiving country. R&D centers and DI require high-qualified specific infrastructure and human resources. Technology transfer is complicated, costly, and with low chance of success, which makes its rate very low (AMARANTE, 2013, p. 12). In addition, the transferred technology is not the most advanced one of the producing country, or is an incomplete technology that does not ensure strategic dependence of the receiving country.

The Brazilian Defense Industrial Base (BID) is mostly formed by organizations that research, develop, and produce DM of low, medium-low, and medium-high-intensity technology, and which represent 75% of the products purchased by the Brazilian FA. Technological limitations impose restrictions on DM production; however, they do not prevent the capacity to produce weapon systems of low and medium-intensity technology, developed to fill a void (niche) of the market due to the tendency toward oversophistication of weapons produced by advanced countries (DAGNINO, 2010, p. 79).

The Brazilian government, with emphasis on the END, has given incentives to DI or ensured resources for programs it considers priority such as the production of the nuclear-powered submarine. However, the growth of budgetary resources earmarked for major retrofit programs or purchase of new means for the FA was not accompanied by the increase in R&D investment. In this sense, the impetus to DI sought in technology transfer will be counterproductive, since it depends on R&D infrastructure to broaden the success rate.



Government incentives to BID have two main lines: 1. financing and incentives and 2. acquisition of DM from Brazilian companies (products and services developed and produced in Brazil or in cooperation with other countries). Incentive and financing programs, focusing on the END, aim to qualify the structure of Brazilian companies of the DI and to contribute to the emergence and maintenance of companies in the sector.

In 2013 the Brazilian government created a package of incentives, with the Regime Especial Tributário para a Indústria de Defesa (Special Tax Regime for Defense Companies – RETID), granting tax incentives to companies that produce DM (SCHMIDT; ASSIS, 2013, p. 26). Then, the government released the Inova Aerodefesa plan, with financial resources accounting for R\$2.9 billion, of the state agency Financiadora de Estudos e Projetos (Financing of Studies and Projects – FINEP) and the Banco Nacional de Desenvolvimento Econômico e Social (Brazilian Development Bank – BNDES), earmarked for innovative projects in the sectors of aerospace, defense, safety, and special materials applied to these areas (SILVEIRA, 2013). Nevertheless, resources were focused on specific areas and the civil-military-business organization required for R&D and DM production was not verified.

There was no significant change in expenditures on R&D, since the release of the END and the interaction between research centers and the Brazilian DI is still very incipient, if not non-existent. Expenditures due to R&D of new products are responsible for a significant portion of the investment cost in the production of armaments. To this end, it is necessary to ensure economies of scale and to produce products that deploy technology to military use in greater amounts. If production is restricted to the domestic market of the producing country or the number of orders is low, the cost of the produced unit grows, which makes exports necessary to recover the investment (BUZAN, 1991, p. 61-63).

## **BRAZIL AND REGIONAL COOPERATION IN DM**

Stagnation of DM exports in the period after 1990 dramatically interfered in the productive dynamics of DI and concentrated exportable DM in a few products, which imposes on the Brazilian DI two alternatives to develop its production potential: 1. the significant increase in defense expenditures earmarked to R&D and the national production of DM; and

2. regional cooperation in R&D and DM production with South American countries. The first alternative seems distant from the Brazilian reality. Indeed, the expenditures of the FA are mostly concentrated in the payrolls of personnel, particularly in the payment of pensions, considering the total expenditures. Therefore, we believe that the value available for the financing of the production and acquisition of DM should not undergo significant changes in short and medium terms. Regional cooperation seems a better alternative to the extent that it is possible to produce, initially, DM of low and medium-intensity technology and, later, to evolve qualitatively into products of greater technological content. To decrease costs, European countries have created multinational consortia to cooperatively face the production of weapon systems such as the Eurofighter Typhoon case (BUZAN, 1991, p. 63). Likewise, the modern conception of producing weapon systems in cooperative system is characterized by gains in reducing the duplication of research and development activities (HARTLEY, 2007, p. 9).

The production of weapon systems within an international cooperation context can take place in two situations: 1. development of new products through bilateral agreement or a consortium of countries; and, 2. the manufacture of DM that is already being produced, with technology transfer from the primary producer to another country through bilateral agreement or as consortium of countries. In both cases, within the South America context, active participation of Brazil and Brazilian DI are vitally important to the development of cooperation in the segment.

In December 2008, South American countries, due to the Brazilian initiative, created with the Union of South American Nations (UNASUR), the Conselho de Defesa Sul-Americano (South American Defense Council – CDS), a court for consultation, cooperation, and coordination in the defense field (UNIÓN DE NACIONES SURAMERICANAS, 2008). The END encourages Brazilian participation in the BID integration into South America under the coordination of CDS, without the participation of foreign countries (those outside the region) (BRASIL, 2008, p. 17). The initiative of CDS members to cooperate in DM production has great political and strategic significance to the subcontinent, and it offers to Brazil and its BID, the most important in South America, the possibility of contributing to expand the production of regional manufacturing DM. In the 2012 and 2013 Action Plans, CDS approved the regional development and production of two weapon systems. One was the basic trainer aircraft under responsibility of Argentina and co-responsibility of Chile, Ecuador,

Peru, Brazil, and Venezuela (UNASUR, 2012). The other was the unmanned aerial vehicles (UAVs) under Brazil's responsibility and co-responsibility of Argentina, Chile, and Venezuela (UNASUR, 2012; 2013).

In the 8th Meeting of the Executive Court of the CDS, in 2013, in Lima, Peru, the schedule for the development and production of the basic trainer aircraft, named Unasur I, was announced. The project was developed by the state aeronautical construction company Fabrica Argentina de Aviões (FAdeA) for the deployment in education and training activities of pilots. In April 2013, during the Latin American Aero Defense (LAAD), international exhibition on aerospace and defense technology, held in Rio de Janeiro, Brazil, the advisory committee for management of the project and the assembly of the aircraft was created (BRASIL, 2013).

In June 2014, representatives of the governments of Argentina, Brazil, Ecuador, and Venezuela defined the steps for the funding, development, technical, logistic, and industrial requirements of the Unasur I. To do so, they created a joint-stock company called UnasurAero, in such a way that companies participating in the project could be hired and receive remuneration for the provided materials and equipment. The development stage of the project provided for a cost of US\$60 million. Brazil was responsible for 62% of the subsystems to be used in the aircraft, representing US\$36 million that would be transferred to Brazilian companies participating in the project: Novaer (landing gear), Akaer (wings), Flight Technologies, and Avionics (flight instrument panel). The participation of Argentinian companies accounted for 28% of the value (US\$16 million) to produce doors, propellers, and the assembly of engine and ejection seats. On the other hand, the participation of Ecuadorian and Venezuelan companies accounted for 5% each (US\$3 million), providing aircraft parts. According to the program, once completed the development stage, the production model of Unasur I would then be set with funding by Brazil through BNDES (BRASIL, 2014).

Regarding the production of trainer aircraft, the steps were followed and the design of the aircraft was presented within the established term. The design of the aircraft does not require great technological sophistication for its development and production, since it is an aircraft intended for primary training of pilots. When starting the cooperation in the production of weapon systems, for an aircraft that does not require high technology in its production, CDS members privileged the possibility of integrating a considerable portion of the 12 member countries of the organization, strengthening cooperation and confidence between them.

However, the program for the production of the basic trainer aircraft lost impetus because of the worsening of the Brazilian political and economic crisis and the Argentinian disagreements about the project. On the other hand, the existence of aircraft of the same segment of Unasur I, in production or under development in several South American countries, caused the overlapping of the project and weakening of the position of the consortium of countries in charge of manufacturing the aircraft.

In March 2014, the Brazilian private company Novaer presented its basic trainer aircraft named TX-c, low-wing, single-engine that has been evaluated by FAB to replace the T-25 trainer aircraft, which are at the end of their useful life. Since 1981, Chile produces the Pillán-T-35 trainer aircraft, designed and developed by the state aeronautical construction company Enaer. The Peruvian government has entered into agreement with the South Korean company Korea Aerospace Industries (KAI) for under license production of the KT-1 trainer aircraft, through the state company Seman, which is linked to the Air Force of the country. In Colombia, the state company Ciac developed the T-90 Calima, trainer aircraft that flew for the first time in 2010. In 2011, the first units were integrated into the Colombian Air Force. In October 2013, the government of Bolivia has announced the development of Tiluchi trainer aircraft, which shall be produced at facilities in which US\$5 million will be invested. In April 2014, the Ecuadorian government announced the construction of the first aircraft produced in the country, a trainer aircraft that will also have fumigation capacity. To do so, the government announced a contribution of resources in the amount of US\$3.5 million for the construction of an aircraft factory (LOPES, 2014).

The limited number of countries that were willing to purchase Unasur I compromised the viability of the project. From an economic point of view, the production of a small number of units raises the unit cost of the aircraft. The lack of involvement of the main South American aircraft manufacturers (Embraer, Enaer, and Ciac), in the first CDS negotiations for the production of basic trainer aircraft, may have compromised the expectations of other countries regarding technical and economic feasibility of the project and prevented the development of a faster schedule for the development and production of the aircraft. Difficulties in the Brazilian economy that incited budget cuts provided for 2016 and 2017 interfered in the announced program, since Brazil, through BNDES, was in charge of financing part of the project. Because of the difficulties in making the aircraft economically feasible, given the limited number of

orders, only a strategic decision of the participating countries, Brazil being highlighted, aiming at consolidating a regional space of cooperation in the manufacture of defense products, could enable the production of basic trainer aircraft.

In addition, Brazil has great importance in the development of the regional system of unmanned aerial vehicles (UAVs) provided for in the 2013 Action Plan. In 2014, there were advances in the definition of the CDS regional UAV project. At a meeting of member countries of CDS to discuss technical details of the project named "Uav Unasur," held in Brasília, Brazil, in September 2014, under the coordination of Brazil and with the participation of South American countries, it was defined that the equipment will be a medium-sized aerial platform to which, initially, surveillance missions will be assigned. The choice of the platform allowed planning the next step, with the definition of operational issues: choice of engines; payload sensors; UAV communication system with the ground control station, and aircraft safety issues (BRASIL, 2014). In December 2014, in Salvador, Brazil, CDS members defined the UAV technical requirements. In the final document, it was established that sensors and electronics must be designed with technological resources to withstand sudden changes in temperature and humidity and operate both in the Amazon and in the Andean regions. The Uav Unasur (medium-sized) will feature a ground station, a data transmission and reception system, and two or more aerial platforms (aircraft). According to the schedule, the Uav Unasur project was expected to enter into the definition stage of the business model and distribution of assignments in 2015. However, there was a discontinuity in the steps envisaged to the program, partly as a result of the Brazilian economic and political crisis. After this step, the project should enter the definition stage of the logistic and industrial requirements (BRASIL, 2014).

Considering the developing programs of CDS facing uncertainties due to political and economic issues, other alternatives for regional cooperation can be sought. Brazil and South America are dependent on external suppliers to provide their defense systems. As we can observe in Table 1, in 2014, South American countries imported US\$1.047 billion in weapon systems, not to mention light armaments. Despite representing a small percentage of total worldwide sales of weapon systems, South American purchases reached a significant value for the region. Most part of the weapon systems that are currently imported could be replaced by DM of low and medium-intensity technology produced by the Brazilian DI or in cooperation with the member countries of CDS. Furthermore,

we can also note that, between 2014 and 2015, there was a fall in imports of weapon systems by South American countries, with imports accounting for US\$991 million in 2015. The decline in South American imports recorded in the analyzed period contrasts with the consolidated position of the 50 largest countries importers of weapon systems in the world, which broadened their acquisitions to US\$28.62 billion in 2015, in comparison with US\$28.07 billion in 2014, indicating a discouragement in the aftermath of the economic crisis that started in 2008 (SIPRI, 2014; 2015).

The annual value of South American imports of weapon systems, which retreated in 2014 for a value accounting for almost

US\$1 billion, has already reached US\$2 billion annually in the first decade of the 2000s (SIPRI, 2000; 2014). Two hypotheses can be raised as an explanation for the decline in South American imports indicated by the Stockholm International Peace Research Institute (SIPRI). The first is associated with the budgetary constraints caused by the impact of the international economic crisis of 2008 in South America, which forced some countries of the subcontinent to cancel or postpone the purchase and modernization of their armaments. The second may indicate the interruption of a series of acquisitions of advanced and high-cost weapon systems, which started in the mid-2000s, with the incorporation to the Venezuelan defense system – through acquisitions together with Russia – of armaments such as the Sukkoi SU-30MK fighter planes (2006/2008) and the Missile System BUK/SA-17 (2009). In addition, during the period, Chile acquired secondhand American manufacturing F-16C fighter planes purchased from Holland and delivered in the 2010/2011 biennium; and Ecuador acquired weapon systems after the Colombian attack in 2008. Brazil and Colombia kept their expenditures focused on the replacement and modernization of weapon systems, but without acquisitions comparable with those of Venezuela and Chile. In other countries, expenditures remained within the standard (SIPRI, 2005; 2012). Because they are systems of greater technological sophistication, it is unlikely that the fall in imports is linked to a process of substitution for similar materials produced in the region. However, a more comprehensive and accurate analysis will depend on the comparison with data regarding subsequent years.

*Table 1 – Value of imports of weapon systems in South America*

Country	Values in US\$ million	
	2014	2015
Argentina	14	23
Bolivia	46	7
Brazil	284	289
Chile	125	114
Colombia	190	215
Guyana	*n.i.	*n.i.
Ecuador	53	1
Paraguay	0	0
Peru	153	169
Suriname	0	3
Uruguay	9	8
Venezuela	173	162
<b>Total</b>	<b>1047</b>	<b>991</b>

Source: Original compilation. Connecting to compete – STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. TIV of arms exports to all, 2014-2015a. Available from: <[http://armstrade.sipri.org/armstrade/html/export\\_values.ph](http://armstrade.sipri.org/armstrade/html/export_values.ph)>p. Access on: Nov. 19, 2016. \*Not informed.

From the point of view of defense cooperation, countries such as Argentina and Chile, which have traditional industry companies, and Colombia, which has recently structured a defense industrial park, can produce some DM items in the region or create cooperative arrangements to produce items of low and low-medium-intensity technology.

An important sector for the Brazilian DI is the production of armored vehicles. Between 1974 and 1993, Brazilian DI exported US\$4.7 billion in armaments. Among these, Engesa has contributed to export large amount of armored wheeled vehicles to several South American countries (MORAES, 2010, p. 63). After 30 years, the Brazilian DI developed a new armored wheeled vehicle, the VBTP-MR Guarani. Developed by the Army's CTE<sub>x</sub> and produced by Iveco, accounting for a unit cost of US\$1,25 million, Guarani, with

the technological upgrade, has features similar to those of armored vehicles produced by Engesa at that period.

The production in cooperation of armaments, such as weapon systems, may take place both in the development of new products and in the manufacture of existing defense products. Guarani allows, with financing conditions and technology sharing, the production of parts and some of its components by defense companies from different countries in South America, especially in Argentina, Chile, and Colombia, and may be used by the South American FA.

For other South American countries, shared production allows replacing obsolete equipment with new ones produced with components and parts manufactured in the subcontinent and at a cost lower than that of the international market. Depending on the cost, many South American countries, including Brazil, acquire secondhand weapons and with significant technological delay. There are, however, strategic and tactical implications that define the purchase of armaments from the countries.

Table 2 shows that there are 986 units of armored wheeled vehicles of Brazilian manufacturing, and it indicates that the potential sale of this equipment, if replaced with the armored Guarani, can reach US\$1.32 billion. Brazilian Army provides for the acquisition of 2,044 armored units, including the replacement of 631 vehicles manufactured by Engesa still in use. Chile and Venezuela, which had armored vehicles produced in Brazil by Engesa, no longer use them because of the end of their useful life, which makes such countries potential buyers of Guarani. In 2012, the Argentine government expressed its interest in the acquisition of 2012 armored units; however, the contract confirming the purchase was not signed (SIPRI, 2012; 2013b).

Cooperation for the production of weapon systems, as it already occurs with the KC-390 cargo aircraft, is advantageous for the Brazilian DI, which can expand the production increasing scale and decreasing costs.



*Table 2 – Armored vehicles produced by Engesa in use in South America*

Country	Values in US\$ million (2014)	
	EE-9 Cascavel	EE-11 Urutu
Argentina	0	0
Bolivia	24	24
Brazil	408	233
Chile	0	0
Colombia	119	56
Guyana	6	0
Ecuador	32	18
Paraguay	28	12
Peru	0	0
Suriname	6	15
Uruguay	15	0
Venezuela	0	0
<b>Total</b>	<b>638</b>	<b>348</b>

Source: Original compilation. INTERNATIONAL INSTITUTE FOR STRATEGIC STUDIES. The military balance 2014. London, 2014. Chapter 8. Latin American and the Caribbean, p. 355-410.

Interaction between the Brazilian DI, with more complex infrastructure and greater dynamism at the regional level, and their South American counterparts has in CDS an important forum for cooperation in the DI field. In such forum, bilateral negotiations could be replaced with a greater narrowing of regional cooperation, making Unasur a priority space to define a regional DI policy.

The program for producing KC-390, the military aircraft for transport and tactical support, with technical characteristics, load capacity, and troop transport, similar to the Lockheed C-130 Hercules aircraft, is another product of the Brazilian DI to broaden regional cooperation. The program to build the KC-390 is expected to consume US\$2 billion, and the first flight of the aircraft prototype of 23.6 tons occurred early in 2015. Part of the components of the aircraft will be produced by the Argentinian FAdeA, in a consortium which

involved the Brazilian Embraer Defense & Security and companies from Portugal and Czech Republic (BRASIL, 2013). The cost of each KC-390 unit is estimated at US\$80 million (GODOY, 2014). Table 3 shows the potential sales of the KC-390 in South America. If the C-130 Hercules aircraft were replaced as medium-sized military transport aircraft in the region, sales accounting for US\$4.7 billion would be generated, only in South America.

*Table 3 – Medium-sized military transport aircraft  
in use in South America*

Country	Values in US\$ million (2014)
	<b>Hercules C-130 aircraft</b>
Argentina	9
Bolivia	4
Brazil	23
Chile	3
Colombia	7
Guyana	0
Ecuador	4
Paraguay	0
Peru	2
Suriname	0
Uruguay	2
Venezuela	5
<b>Total</b>	<b>59</b>

Source: Original compilation. INTERNATIONAL INSTITUTE FOR STRATEGIC STUDIES. The military balance 2014. London, 2014. Chapter 8. Latin American and the Caribbean, p. 355-410.

FAB has ordered 28 KC-390, and there are 32 purchase letters of intent of five countries. Among the countries that expressed their intent to purchase the aircraft, three are South American. Argentina has ordered 6 aircraft, Chile, 6, and Colombia, 12 units (GODOY, 2014). However, only Argentina participates in the consortium of companies led by Embraer to produce the aircraft. FAdEA will be responsible for manufacturing spoilers, landing gear nose doors, ramp

door, flap fairings, tail cone, and overhead compartment (EMBRAER..., 2011). In 2010, during after signing of the letter of intent (Colombian government and Embraer), the Brazilian company started studying the installation of a factory of machined parts in Colombia, a project that did not continue (EMBRAER..., 2010). Initially, Colombia and Chile did not participate in the KC-390 production, despite having aviation companies with capacity to provide aircraft parts.

The modernization of the Brazilian DI, crucial to expand the South American cooperation due to its importance at the regional level, depends on programs for the acquisition of means and retrofit of the Brazilian FA. The Plano de Articulação de Equipamento e Defesa (Coordination Plan of Equipment and Defense – PAED) provides for R\$211 billion earmarked for Navy, R\$132 billion for FAB, and R\$60 billion for the Army, totalling R\$403 billion to be applied between 2012 and 2030 (BRASIL, 2012, p. 192-205). Nevertheless, two issues are essential when analyzing the programs. The first regards the acquisition of transferred technology of the purchased armaments, since most projects depend on foreign technology. The autonomous development of technology for military use is a complex process that demands heavy investment in capital, time, infrastructure, and high-qualified specific human resources. Brazilian DI has lost dynamism since the late 1980s for not relying on an infrastructure capable of assimilating technological updates of the manufactured products. Despite the investments provided for the next years of the FA retrofit, an interaction process between research centers and productive parks is not expected, as there was no significant change in the financing structure for R&D in DM.

The second issue regards the budget expenditure. Budget transfer from the Federal Government to the Ministry of Defense between 1995 and 2011 reached an average of 1.58% of the GDP. The quota of resources on the part of the Federal Government, to serve other areas and, also, to pay interest rates of government debts with a primary surplus, was crucial for the discontinuity of some Defense programs. Budgetary data show that the expenditures of the Ministry of Defense on investments fell from R\$8.9 billion in 2010 to R\$6.5 billion in 2011 (BRASIL, 2012, p. 227-230).

We believe that the PAED will have conditions to be implemented only with a profound change in the financing model of R&D in DM, combined with the interaction between the research centers and the national DM producers, on one hand and, on the other, with mechanisms to ensure the implementation of the expenditures provided for in the budget to achieve retrofit and modernization programs of the FA. Moreover, the same model may be replicated in the region

with the creation of mechanisms and institutions capable of cooperatively coordinating DM production, which is the case of Unasur/CDS.

## STRATEGIC CONVENIENCE OF REGIONAL COOPERATION

On national DI, the autonomy desired in the DM production, especially of weapon systems, remains a distant reality. If, according to Buzan, countries that possess advanced technology cooperate on several projects for the production of defense equipment, how do we conceive that Brazil, which has a BID, produces mainly DM of low and medium-intensity technology, and without a captive scale market, could achieve strategic autonomy? Technological outdateding due to lack of structure in R&D on the BID, as well as lack of productive scale because most part of the production is directed to a restricted domestic market, constitutes the narrow limit of the Brazilian DI development. South American cooperation would be an opportunity to deepen the Brazilian and regional DI. Recent initiatives of Unasur and its CDS, although incipient, point to a horizon of cooperation with possibility of later converging to defense policies integrated among countries, promoted by cooperative regional production of defense products. Therefore, in the CDS's 2013/2014 Action Plans, a Working Party coordinated by Brazil, Ecuador, and Argentina was created, and it was in charge of compiling an inventory of industrial capabilities for defense products. The result was the creation of a website that gathers information regarding civil and military companies that are suppliers of inputs for defense. In such website, the FA and the Ministries of Defense of Unasur countries may consult defense products, quality, and prices. Although this is an important and unprecedented step to replace regional imports and, therefore, to aspire to a less strategic dependence on foreign suppliers, we still perceive the lack of the aforementioned interaction with R&D centers and even their creation, linking scientific-technological research centers, companies aiming to develop products of such centers, and a state economic support that guarantees such products in the region to make this association of interests a virtuous cycle. There is commitment to perform such binding gathering capacities of research and production centers in the region. We believe that confidence-building result in the transparency required to accomplish this great regional project. The recent creation of the Unasur headquarters, which indicates a relaunch of the integrative regional project, can incite this process (UNASUR, 2013; 2014).

If Brazil was more assertive regarding regional cooperation for DM production, considering its economic influence and industrial capacity, it could contribute to four aspects: 1. creation of mechanisms for technology transfer; 2. technological training of qualified work force in subcontinent countries; 3. training of specialists in the management of programs in the DI field; and 4. development of financing mechanisms for CDS programs.

For Brazil, the development of a regional production chain would allow the increase in production and consequent decrease in the unit cost by leveraging the growth in exports. By limiting the production of Brazilian DI to the local FA, the country loses purchase scale. By cooperating with neighbors in a sensitive and important area for regional integration, Brazil would have great advantages. First, it would produce most of the components and parts. Second, the production would increase for sale to neighboring countries. And third, increased scale favors exports, since the products of low and medium-intensity technology have room in the weapon market. There are benefits to the country by extending the market scale or by organizing a productive chain in which Brazilian products receive components manufactured in neighboring countries, since it strengthens confidence in the leadership of Unasur/CDS as a catalyst of regional cooperation in the defense field.

The success in regional cooperation in DM production depends, to a large extent, on the South American countries to converge toward the adoption of “standard armament.” The existence of similar aircraft under development or in production in the subcontinent prevents the standardization of a basic trainer aircraft of common use by members of Unasur. However, in the development of the Uav Unasur project, there was a preliminary definition of an aircraft model (median platform) in accordance with the need of most CDS countries, which may suggest the adoption of similar procedures in other projects converging on the adoption, on the CDS part, of the concept of a “standard weapon.” The same logic can be used for products that are in production, such as the armored wheeled vehicle, VBT-BR Guarani, or the tactical and refueling transport aircraft, KC-390, which are developed with Brazilian technology. As standard armament of Unasur, they could add South American companies to their suppliers, expanding the market scale and strengthening the development of a regional BID.

## FINAL CONSIDERATIONS

The Brazilian attempt to reduce technological delay compared with the advanced countries, without the desirable expansion of investments in the sector, but with technology transfer agreements, as provided for by the END, is not the solution. Technology transfer is not complete, and what is transferred is never leading-edge technology, reinforcing the strategic dependence on foreign suppliers. The path toward strategic autonomy will only be guaranteed with the development and mastery of own technologies. The race in search of the latest technology will not diminish the strategic disadvantage. Indeed, the acquisition of the technology that won the last war will not ensure victory in the next one. We just need to perceive the “strategic swamp” in which great military powers are, those which flaunt latest technology. Technological specialization does not offer the best preparation for the next war, but the ability to make flexible a strategy that adapts the means and capacities to the adversity to be faced.

For some period, progress has been made in an attempt to influence the strategic thinking with the idea that Revolution in Military Affairs (RMA) was caused by technological innovations. Nevertheless, after repeated failures of the latest technologies in the battle fields – the most notorious and recent in Iraq and Afghanistan –, the hypothesis that the technological supremacy defines the war became debatable and incites a deeper strategic thinking. Nowadays, it is stated that technological innovation of weapon systems only, without an intelligent coordination with the deployment tactics and strategy, considering the proper political perception of the circumstances, cannot decide a war, let alone innovate military affairs. Furthermore, in this age of constant technological advances, political understanding of the circumstances, depth of strategic reflection, and domain of the “art of war” continue to influence decisions regarding the war, as already advocated by Sun Tzu.

The need of adjusting strategic components to politics, to the “Grand Strategy,” according to Lidell Hart (LIDDELL HART, 1982), or to the “National Strategy,” in the words of André Beaufre (BEAUFRE, 1982), encourages us to reflect one more time on the regional surroundings, which were only mentioned in our study, and which could be better developed in further research. Today, South America steps toward a regional cooperation policy, based on transparency and on confidence-building among countries. If the national defense policies of these countries were

consistent with the direction of the regional policy, they would guide their strategic formulations based on the economy of strategic means at regional level, given that transparency and confidence lead to the observation that “where one cooperates, no one dissuades.”

This domestic economy of the region would give breathing room to concentrate strategic regional efforts to deter possible threats of foreign actors against natural, cultural resources, or the sovereign decision of CDS countries. If it is true that where one cooperates, no one dissuades, the strategic significance of the defense material acquisition by CDS countries should reflect security with its neighbors and a strategic deterrent projection out of the region. However, the strategic significance of the acquisition and production of inputs for the defense of South American countries still seems to reflect mistrust of its neighbors and the search for an anachronistic balance of powers based on conventional deterrence, that is, Westphalian values within the regional relationship would prevail. This may reflect a decisional autonomy of the operational strategy regarding the Defense Policy, which would reiterate perception errors and produce unnecessary and useless defense expenditures. South America would gain in resources and strategic capacity if its countries adopted, indeed, a doctrine of subregional cooperation. This would replace Westphalian values, still resistant, and yet it could accomplish

a regional policy of cooperative acquisition and production of means for regional defense. The region could develop, for each country and in a complementary way, a cooperative regional policy for the development of autonomous science and technology, allowing own defense resources and increasing the decisional autonomy of their representatives. On the other hand, such regional development could bring the region and the strategic autonomy objective together, a condition to decide the fate of South American countries in a region of peace and prosperity, where the idea of conflict between neighbors is definitely abandoned.

A greater or smaller approximation of South American countries can serve both to create a robust defense and to facilitate a domination strategy of the whole region by foreign actors. The difference between both possibilities does not depend only on the strategic design, tactical commitment, technological domain, and the military installed capacity, but especially on the political lucidity of its leaders to coordinate all these aspects for the benefit of a region that is peaceful, cooperative, supportive, distinguished, independent, and vigorously defended.

## REFERENCES

ABETTI, P.; MALDIFASSI, J. *Defense Industries in Latin American Countries: Argentina, Brazil, and Chile*. London: Praeger, 1994.

AMARANTE, J. C. A. *A base industrial de Defesa Brasileira*. Rio de Janeiro: IPEA, ago, 2012. (Texto para discussão, 1758).

AMARANTE, J. C. A. *Processos de obtenção de tecnologia militar*. Rio de Janeiro: IPEA, out, 2013. (Texto para discussão, 1877).

BATTAGLINO, J. O Brasil e a criação do Conselho de Defesa Sul-Americano: uma convergência de vantagens. *Nueva Sociedad*, Buenos Aires, p. 79-89, dez. 2009. Edição especial em português.

BEAUFRE, A. *Introducción a la Estrategia*. Buenos Aires: Ed. Struhart & Cia., 1982.

BRASIL. Ministério da Defesa. *Estratégia Nacional de Defesa: paz e segurança para o Brasil*. 2. ed. Brasília, DF, 2008.

BRASIL. Ministério da Defesa. Secretaria de Coordenação e Organização Institucional – SEORI. Portaria Normativa n. 899, de 19 de julho de 2005. Aprova e a Política Nacional da Indústria de Defesa – PNID. *Diário Oficial [da] República Federativa do Brasil*, Brasília, DF, 20 jul. 2005. Seção 1, p. 26. Disponível em: <[http://bdlegis.defesa.gov.br/gerar\\_html\\_norma/gerar\\_html\\_norma.php?id\\_norma=92](http://bdlegis.defesa.gov.br/gerar_html_norma/gerar_html_norma.php?id_norma=92)>. Acesso em: 20 fev. 2014.

BRASIL. Ministério da Defesa. *Livro Branco de Defesa Nacional*. Brasília, DF, 2012. Disponível em: <<http://www.defesa.gov.br/arquivos/2012/mes07/lbndn.pdf>>. Acesso em: 3 mar. 2014.

BRASIL. Força Aérea Brasileira. *Projeto KC-390 recebe sinal verde para construção de protótipos*. Brasília, DF, 25 mar. 2013. Seção Reaparelhamento. Disponível em: <<http://www.fab.mil.br/portal/capa/index.php?mostra=14363>>. Acesso em: 05 set. 2014

BRASIL. Presidência da Republica. *Países da Unasul criam comitê consultivo do primeiro avião de treinamento básico regional*. Brasília, DF, 10 abr. 2013. Disponível em: <<http://www2.planalto.gov.br/excluir-historico-nao-sera-migrado/paises-da-unasul-criam-comite-consultivo-do-primeiro-aviao-de-treinamento-basico-regional>>. Acesso em: 2 set. 2014.



BRASIL contribui em produção de aeronave sul-americana. *Portal Brasil*, Brasília, DF, 16 jun. 2014. Seção Defesa e Segurança. Disponível em: <<http://www.brasil.gov.br/defesa-e-seguranca/2014/06/brasil-contribui-em-producao-de-aeronave-sul-americana>>. Acesso em: 27 dez. 2014

BRASIL. Ministério da Defesa. *Países da Unasul se reúnem para definir projeto de VANT regional*. Brasília, DF, 02. set. 2014. Disponível em: <<http://www.defesa.gov.br/index.php/noticias/13610-paises-da-unasul-se-reunem-para-definir-projeto-de-vant-regional>>. Acesso em: 27 dez. 2014.

BRASIL. Ministério da Defesa. Países da Unasul concluem definição de requisitos técnicos de VANT regional. Brasília, DF, 02. dez. 2014. Disponível em: <<http://www.defesa.gov.br/noticias/14411-paises-da-unasul-concluem-definicao-de-requisitos-tecnicos-de-vant-regional>>. Acesso em: 27 dez. 2014.

BUZAN, B. *Introducción a los estudios estratégicos: tecnología militar e relaciones internacionales*. Madri: Servicio de Publicaciones del E.M.E, 1991.

CAVAGNARI FILHO, G. L. Brasil: a dimensão estratégica da potência regional. *Carta Internacional*, v. 7, n. 80, p.1-3, out. 1999.

CAVAGNARI FILHO, G. L. P & D Militar: situação, avaliação e perspectivas. In: SCHWARTZMAN, S. (Ed.). *Ciência e Tecnologia no Brasil: Uma Nova Política para um Mundo Global*. Rio de Janeiro: Ed. Fundação Getúlio Vargas, 1996. Disponível em: <<http://www.schwartzman.org.br/simon/scipol/pdf/militar.pdf>>. Acesso em: 03 de fev. 2014.

CONCA, K. *Manufacturing insecurity: the rise and fall of Brazil's military-industrial complex*. London: Lynne, 1997.

COSTA, D. *Estrategia nacional: la cooperación sudamericana como camino para a la inserción internacional de la región*. Buenos Aires: Prometeo Libros, 2005.

DAGNINO, R. *A indústria de defesa no governo Lula*. São Paulo: Expressão Popular, 2010.

EMBRAER anuncia discussões de parceria com a Colômbia no programa KC-390: governo colombiano manifesta intenção de adquirir 12 jatos de transporte militar da Embraer. *EMBRAER*, 01 set. 2010. Seção Press Realeases. Disponível em: <<http://www.embraer.com/pt-BR/ImprensaEventos/Press-releases/noticias/Paginas/EMBRAER-ANUNCIA-DISCUSSOES-DE-PARceria-COM-A-COLOMBIA-NO-PROGRAMA-KC-390.aspx>>. Acesso em: 25 nov. 2014.

EMBRAER defesa e segurança e FAdeA assinam contrato de parceria para programa KC-390: fábrica Argentina de aviões “Brig. San Martín” S.A. (FAdeA) fornecerá partes estruturais para o novo avião. *EMBRAER*, 13 abr. 2011. Seção Press Realeases. Disponível em: <<http://www.embraer.com/en-us/imprensaeventos/press-releases/noticias/pages/embraer-defesa-e-seguranca-e-fadea.asp>>. Acesso em: 25 nov. 2014.

FERREIRA, M. J. B. *Dinâmica da inovação e mudanças estruturais: um estudo de caso da indústria aeronáutica mundial e a inserção brasileira*. 2009. Tese (Doutorado)-UNICAMP, Campinas, 2009.

GODOY, R. Um gigante feito para disputar mercado de US\$ 3 bi. *O Estado de São Paulo*, São Paulo, 21 maio 2014. Seção Economia. Disponível em: <<http://economia.estadao.com.br/noticias/geral,um-gigante-feito-para-disputar-mercado-de-us-3-bi-imp-,1169439>>. Acesso em: 25 nov. 2014.

HARTLEY, K. Defence economics: achievements and challenges. *The Economics of Peace & Security Journal*, Bristol, v. 2, n.1, p. 45-50, 2007.

LIANG, Q.; XIANGSUI, W. *A guerra além dos limites: conjecturas sobre a guerra e a tática na era da globalização*. Beijing: Pla Literature and Arts Publishing House, fev. 1999.

LIDDELL HART, B. H. *As grandes guerras da História*. São Paulo: IBASA, 1982.

LOPES, R. Unasul I: um avião para (quase) ninguém. *Defesanet*, 29 abr. 2014. Disponível em: <<http://www.defesanet.com.br/al/noticia/15180/Unasul-I--um-aviao-para-%28quase%29-ninguem-/>>. Acesso em: 05 jun. 2016.

MORAES, R. F. Ascensão e queda das exportações brasileiras de equipamentos militares. *Boletim de Economia Política Internacional* – IPEA, Brasília, DF, n. 3, p. 59-70, jul./set. 2010.

O'DONNELL, G. Challenges to Democratization in Brazil. *World Policy Journal*, v. 5 n. 2, p.281-300, Spring 1988.

PRIMER avión militar diseñado por Unasur estará listo em el 2016. *Andina*, Lima, 16 may 2013. Disponível em: <<http://www.andina.com.pe/Espanol/noticia-primer-avion-militar-disenado-unasur-estara-listo-el-2016-458892.aspx#.UfUjc9JkyW0>>. Acesso em: 20 ago. 2013.

SCHMIDT, F. H.; ASSIS, L. R. S. A dinâmica recente do setor de defesa no Brasil: análise das características e do envolvimento das firmas contratadas. Rio de Janeiro: IPEA, out. 2013. (Texto para discussão, 1878).

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *Armaments, Disarmament and International Security*. Estocolmo, 2014. Disponível em: <<http://www.sipri.org/yearbook/2014/2014>>. Acesso em: 25 fev. 2015.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *TIV of arms exports to all, 2014-2015a*. Estocolmo, 2014a. Section Sipri Arms Transfers Database. Disponível em: <[http://armstrade.sipri.org/armstrade/html/export\\_values.php](http://armstrade.sipri.org/armstrade/html/export_values.php)>. Acesso em: 19 mar. 2014.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *TIV of arms exports from Brazil, 2012-2013b*. Estocolmo, 2014b. Section Sipri Arms Transfers Database. Disponível em: <hHYPERLINK "[http://armstrade.sipri.org/armstrade/html/export\\_values.php](http://armstrade.sipri.org/armstrade/html/export_values.php)"ttp://armstrade.sipri.org/armstrade/html/export\_values.php>. Acesso em: 4 abr. 2014.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *TIV of arms imports to the top 50 importers, 2014-2015*. Estocolmo, 2014. Section Sipri Arms Transfers Database. Disponível em: <hHYPERLINK "[http://armstrade.sipri.org/armstrade/html/export\\_values.php](http://armstrade.sipri.org/armstrade/html/export_values.php)"ttp://armstrade.sipri.org/armstrade/html/export\_values.php>. Acesso em: 14 mar. 2015.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *Transfers of major conventional weapons: sorted by supplier: deals with deliveries or orders made for year range 2000 to 2014*. Estocolmo, 2014. Section Sipri Arms Transfers Database. Disponível em: <[http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php)>. Acesso em: 4 mar. 2015.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE. *Transfers of major conventional weapons: sorted by recipient: deals with deliveries or orders made for year range 2005 to 2014*. Estocolmo, 2014. Section Sipri Arms Transfers Database. Disponível em: <[http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php)>. Acesso em: 17 mar. 2015.

SILVEIRA, V. Incentivo federal vai impulsionar setor no Brasil. *Valor Econômico*, São Paulo, 21 out. 2013. Disponível em: <<http://www.valor.com.br/empresas/3310360/incentivo-federal-vai-impulsionar-setor-no-brasil>>. Acesso em: 03 mar. 2014.

UNIÓN DE NACIONES SURAMERICANAS. Centro de Estudios Estratégicos de Defensa. *Plán de Acción 2012*: CDS. Buenos Aires, 2014. Disponível em: <<http://www.ceedcds.org.ar/Espanol/09-Downloads/Esp-PA/Plan-de-Accion-2012.pdf>>. Acesso em: 2 set. 2014.

UNIÓN DE NACIONES SURAMERICANAS. Centro de Estudios Estratégicos de Defensa. *Plán de Acción 2013* - CDS. Buenos Aires, 2014. Disponível em: <<http://www.ceedcds.org.ar/Espanol/09-Downloads/Esp-PA/Plan-de-Accion-2013.pdf>>. Acesso em: 2 set. 2014.

UNIÓN DE NACIONES SURAMERICANAS. Centro de Estudios Estratégicos de Defensa. *Plán de Acción 2014* - CDS. Buenos Aires, 2014. Disponível em: <<http://www.ceedcds.org.ar/Espanol/09-Downloads/Esp-PA/Plan-de-Accion-2014.pdf>>. Acesso em: 2 set. 2014.

UNIÓN DE NACIONES SURAMERICANAS. Tratado Constitutivo da Unasul. Brasília, DF, 23 maio 2008a. Disponível em: <<http://www.itamaraty.gov.br/temas/america-do-sul-e-integracao-regional/unasul/tratado-constitutivo-da-unasul>>. Acesso em: 30 ago. 2014.

Received on: 06/03/2017

Approved on: 22/08/2017