

# Defence and Regional Integration: The Case of the Brazilian Weapons Industry

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This paper discusses the relationship between technological development and the weapons industry in Brazil, stressing the dependence of the latter on the former. It shows how changes in the arms trade have meant that the production of small arms for export is currently prioritized. The conclusion is that maintaining projects of this nature is only feasible by taking advantage of the remaining industrial base for dual-use production, i.e., to meet both civilian and military demand. Lastly, the possibility that the defence industry may work as a regional integration mechanism is raised.

Keywords: Armed Forces; Weapons; Economic development; Defence; Security.

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## Introduction

The construction of the concept of Human Safety, also known as “multidimensional safety”, to replace that of National Security — formulated during the Cold War and the trigger for much disagreement between neighbours — has integral and holistic development as one of its main principles. In 1993, the Special Committee of Hemispheric Security of the Organization of American States (OAS), entrusted with the mandate of studying such changes, broadened the concept, holding the view that “unlike collective safety which views the response to aggression as the defeat of its perpetrators, cooperative safety [or human safety], aims at preventing such aggression”.<sup>1</sup>

The same studies concluded that, in countries like Brazil and its neighbours, prevention was directly linked to economic reality, which implied a relationship between safety and development and reinforced what the Brazilian government has always upheld

at international institutions, i.e., Brazilian foreign policy has always maintained the relationship between the economy and security as one of its pillars.

Taking such relationship as the pillar for state-building in South American countries and considering the role of the Armed Forces in the various processes of national independence, it is impossible to talk of development in these countries without taking into account the military participation in forging the State and its bureaucracy. In other words, the safety/development binomial in the South American region has translated into the military's defence of national interests, which meant promoting national economic development.

Owing to the absence of civilian elites, or to the fact that the officer corps belonged to the ruling elite, the Armed Forces played an active role in the process of Brazilian development (Janowitz 1967). For instance, the construction of a significant number of so-called basic industries was the product of direct military intervention. In the context of the process of national development and in its quest for regional hegemony, Brazil developed a considerable arms industry. If the current concept of security focuses on conflict prevention, then weapons production should also be related to preventing war and promoting economic gains that lead to cooperation in security matters.

Given the nature of this article, and the impossibility of analysing all of the relationships between safety, defence, cooperation and development, our aim is to provide a brief history of the Brazilian weapons industry, evaluating two hypotheses: 1) the Brazilian weapons industry began its development as a product of Science and Technology (S&T) development; 2) the participation of the military institution in this process was far smaller than that of individual military officers.

In order to facilitate the analysis of these hypotheses, the text has been divided into four parts. Firstly, the birth of S&T projects in Brazil is reviewed so as to reveal its influence in promoting the national weapons industry. Secondly, we discuss the development, the peak and the downfall of this industry, all of which occurred in less than 30 years. Thirdly, we observe the process that replaced Brazilian exports of heavy weaponry, basically for military use, by small and medium-sized arms and equipment (up to .45), but still focusing mainly on the foreign market. Lastly, we list some of the factors pointing to a positive relationship between the sale of this type of weapon (intended mostly for civilian and policing purposes) and the strengthening of regional integration.

## **The Organization of S&T Studies in Brazil**

Over the course of the 1940s, the differences surrounding the issue of how to pursue national development had a significant impact on the Brazilian Armed Forces. So much so that the heated electoral disputes at the Military Club pitted those in favour of financing

the national industry independently (the red group), with decisive state participation, against those who proposed associated development as the way forward, i.e., that national and foreign investment were required to set up the industry that would eventually turn the country into a regional power (the blue group) (Mendonça 1988).

One of the facts that may have influenced the discussions on development and security was the report *Science: the Endless Frontier*, by Vannevar Bush. Published shortly after the Second World War, it reflected the US American perception that scientific and technological superiority were fundamental for countries' development. In Latin America, S&T progress was seen as the best shield against foreign interference and as decisive in asserting a country's hegemonic capacity (Dias and Dagnino 2005). In parallel, the appearance of nuclear weapons also seriously motivated military interest in the development in S&T (Domingos Neto 2006).

The differences that marked the discussions on the industrial development of the country were overcome, with the idea of using foreign investment for the construction of an industrial complex prevailing. This would be responsible not only for producing weapons, but for fomenting national S&T development, raising the country to the same level as its more developed allies.

However, it was not through the development of the weapons industry that the military embraced S&T in Brazil. On the contrary, the founding of the Military Engineering Institute (IME) in the 18<sup>th</sup> century evinces the fact that military participation in national progress precedes the creation of the Brazilian State. Indeed, it was the Royal Military Academy of Engineering, as it was then known, that trained the very first engineers in the land.<sup>2</sup>

The establishment of a host of institutions to produce and promote science dates back to the 1940s and 1950s. In 1948, the Brazilian Society for the Progress of Science (SBPC) was created, followed by the Brazilian Centre for Physics Research (CBPF) in 1949, by the Technological Institute of Aeronautics (ITA) in 1950 and by the National Council for Scientific and Technological Development (CNPq), whose priority was to master nuclear technology, through the Institute of Pure and Applied Mathematics (IMPA), both of which were set up in 1951. The Coordination for the Improvement of Higher Education Personnel (CAPES) was created in that same extraordinary year, 1951 (Domingos Neto 2006).

However, it was in the 1960s that matching the new frontiers of international scientific and technological progress became an obsession for the Brazilian Armed Forces, convinced as it was that S&T would be a permanent conditioning factor for combat performance. Through the development of the latter, the chances of obtaining swift and decisive operational results would increase, and the conditions for this to occur depended on the continuous modernization of the Armed Forces — backed up by a solid national industry of war materiel. In the long term, technological development would bring about

the necessary conditions to sustain a privileged position for Brazil in the international relations context. In other words, it would enable the reduction in external dependency, the constant modernization of military forces, the consolidation of the defence industry and the incorporation of new technology. The sum-total would be autonomy for the country in the face of other nations.

A brief history of the creation of ITA illustrates the process of military participation in S&T. Subordinated to the Technical Centre of Aeronautics (CTA), it preceded and stimulated the country's weapons industry and, more importantly, it did so by promoting a partnership between the military and civilians, since it was conceived as a university where they would coexist. The admission (hiring) was based solely on merit, which contributed to what eventually turned into an intellectual and ideological Babel, as suggested by Moraes (2006). However, the great innovation of ITA was not the fact that it was a competent Babel, but that it was structured in such a way that it was only to reach civilian spheres in the 1970s.

Unlike other public universities in Brazil, ITA was not structured into cathedrae, but into departments (as is the norm today), providing it with greater agility in implementing plans and projects that quickly came to light. It also contributed to camaraderie, rejuvenating elders and maturing youngsters; contact between teachers and students was far closer than at other Brazilian universities. The fact that everyone resided on the premises is thought to have triggered this proximity between students and teachers, military and civilians. Even if ITA was not the first school to admit both military and civilian students, it was certainly the most successful one in achieving the peaceful coexistence of the two groups.

Built in São José dos Campos, a small town strategically located between Rio de Janeiro and São Paulo and close to the port of São Sebastião, ITA stimulated the creation of several state-of-the-art companies around it, such as the Brazilian Aeronautics Company (EMBRAER), whose first airplane, the *Bandeirante*, came from the drawing boards of ITA researchers, coordinated by the then Colonel Ozires Silva. The prototype of this airplane was built in 1968, a year before the founding of EMBRAER.

EMBRAER was one of the few companies to survive the dismantling of the national weapons industry promoted in the early 1990s, having been privatized in 1994. Its success can be credited to the company's hybrid or dual character, that is, its products serve both military and civilian purposes. Nowadays, it is one of a select few Brazilian companies able to boast an international presence, with factories in China (2002-3), maintenance facilities in Nashville, USA, and in Villepinti, France, both inaugurated in 2006 (Forjaz, 2004).<sup>3</sup>

However, the uniqueness of S&T and war materiel production lies neither in the control nor in the participation of the Armed Forces in the development process, for it was not the military institution as such that carried it out. This was not even the case during the period

of military rule (1964-85). It was the visionary and individual initiative of some military figures coupled with the civic courage (Heller and Fehér 1988, 124-125) of some rulers that created and promoted this development for the sake of national security. The case of ITA is emblematic: while headed by Brigadier Casimiro Montenegro, its mentor, founder and administrator, the Institute's research and autonomy were preserved. During the Vargas and Kubitschek presidencies it was well funded, though less so under President Dutra, who only provided the basics. However, when Castelo Branco came to power (1964), appointing to the Ministry of the Air Force Marshall Eduardo Gomes, a staunch opponent of autonomous development projects such as ITA, the institution almost disappeared (Morais, 2006). This corroborates the hypothesis that the Armed Forces as an institution were not one of the pillars of Brazilian development. Only some of its individual members, who longed for the modernization of the Armed Forces and the uncompromising defence of autochthonous development as the main safeguard of national security, were actively engaged.

In other words, S&T development had the impulse of individual military figures, but the industrial process went ahead through partnerships between state and private firms, as explained Dreyfus et al (2005):

In the Brazilian version of the NSD [National Security Doctrine], economic development and especially industrial development was a way of advancing the permanent interests of the nation to a point where the country (due to its size, vast resources, strategic location and uniqueness) would achieve national greatness and thus would be respected as a regional power with global projection. The defense industry was seen as a catalyst for technological and economic development, but also as a way of building national power. The end result was a vision of national development — including private industry — subordinated to the defense structure of the state.

## Development for Security: The Weapons Industry

Saint-Pierre and Mei (2007) maintain that the Armed Forces only conceived of a project for the production of weapons after the formulation of the National Security Doctrine, a set of ideas that emerged from the Brazil National War College (ESG) after its creation in 1949, but that effectively turned into a normative framework only after the military coup of 1964. Quoting Dreyfus et al. (2005, 254), they state that the stimulus given to the production of weapons was based on the idea that “(...) the defence industry was the catalysing agent for economic and technological development, as well as a means of establishing national power”.

Taking the initiative of stimulating the economy into their own hands, the governing men in uniform would promote a real revolution in Brazilian society, enhancing urbanization,

providing the population with a sense of national belonging, unifying communications, elevating the economy to mass production, especially in the consumer goods industry, but also in some basic industries, such as steel, weapons etc (Domingos Neto, 2006).

In the ambit of the arms industry, from 1974, the Brazilian government implemented the National Military Material Export Policy (PNEMEM), perhaps the only national plan on this issue ever. It proposed that the National Development Bank (BNDE) fund new research into defence involving universities (such as the Institute for Energy and Nuclear Research, linked to the University of São Paulo), public and private companies and military colleges. Through PNEMEM, Brazil reached high export rates. These reduced the country's oil purchase needs through a bartering mechanism, since the major arms importers were Middle Eastern countries, precisely those that then supplied most of Brazil's oil.

The installation of several weapons production plants dates back to the 1960s, making use of the extensive industrial complex built in previous years, so that within a short period of time they had achieved enviable production and export levels. Bolstered by the level of excellence achieved by ITA, throughout those promising years, other institutions were organized: AVIBRÁS, in 1961; ENGESA, in 1965; and EMBRAER, in 1969.<sup>4</sup>

ENGESA, originally a manufacturer of components for oil prospecting and that evolved to the adaptation of trucks to rugged terrains, was subsequently heavily involved with the arms industry, largely owing to the “boomerang” suspension developed by it. Based on an IME design for a reconnaissance vehicle on wheels, it eventually came up with the *Urutu* (an amphibious armoured personnel carrier on wheels) and the *Cascavel* (an armoured reconnaissance vehicle on wheels), both widely sold to the Middle East and South America, with a significant presence also in the national weapons inventory. In 1982, it began its most ambitious project, a medium-sized armoured vehicle, the *Osório*, which incorporated state-of-the-art technology in suspension, armour and weapons systems. Unfortunately, it was not successful due to a boycott of Brazilian products led by the USA. The company went into liquidation in 1996 and its assets were auctioned off (Cruz 2006).

Like EMBRAER, AVIBRÁS was the initiative ITA students and aimed at building light aeroplanes. It developed the basic training aircraft *Falcão* [Hawk] in 1962. Three years later, in 1965, it began the production of rockets, with completely autochthonous technology, giving rise to the *Sonda* family, utilizing solid propellants. This was the starting point for other surface to air bellic equipment, instrumental in the development of the Brazilian Space Programme. Further technological developments in the 1980s produced the *Astros* system, medium-range rockets widely used by Iraq in the Iran- Iraq War. AVIBRÁS also developed and produces satellite communication equipment, remaining Brazil's main supplier of such equipment, as well as explosives and chemicals used both by the defence sector and civilian sectors linked to the security field (Cruz 2006).

As mentioned above, EMBRAER is the most successful company in the national defence industry. Starting off with the production of the cargo and passenger aircraft *Bandeirantes*, soon afterwards it designed and built the *Xavante*, the first Brazilian military training jet plane, the *Tucano*, the only turbo-propeller plane designed specifically for military training, and its successors. These include the EMB-312H (*Super Tucano*) and the ALX (an armed model developed for the Ministry of the Air Force). Its line of passenger and cargo aircraft has gained international recognition and encouraged the company to launch more sophisticated models, such as the *Brasília*, which seems very promising on the international market (107 jets have already been contracted and another 219 are under purchase option), and the EMB-145, a 50-passenger two-engine. In military aviation, it produces the AMX, a subsonic ground-attack fighter, a project which may be understood as a quest for high-tech capability. In 2004, defence industry exports totalled R\$ 300 million, half of which came from EMBRAER (Silveira 2005).

The success of these companies was achieved through a symbiotic relationship in which the government supplied material and human resources, and the private sector turned them into products, especially exports. It is for this reason that by the 1970s and 1980s Brazil already ranked among the ten largest arms exporters in the world (Bastos 2006), with the Middle East as its major customer, particularly as a result of the Iran-Iraq War (1980-1988). It is therefore clear that within twenty years, (1964-1985) the national effort translated into significant progress, as highlighted by General José Carlos Albano do Amarante (2004):

Brazil bent over backwards to develop military technology in the 1960s, 70s and 80s, when the defence industry peaked, ranking 5<sup>th</sup> in world exports. This was the result of well executed and planned R&D policies and industrial growth in the 70s and 80s. In those days, over 90% of the means that furnished the Army were manufactured within the national territory.

The end of military rule in 1985, and the subsequent sidelining of the National Security Doctrine (DSN) as a precept of government actions, made it seem obvious that the weapons industry would no longer be a priority and that its share in the country's exports would fall, particularly as a result of the massive investments required for the advanced technology involved. However, it was not the case. On the contrary: in 1987, arms exports peaked at US\$ 1.5 billion, with an outstanding share of the business going to the Middle East, particularly Iraq, which was then reaching the end of its war with Iran (Silveira 2005).

The end of the abovementioned conflict in 1988, added to factors such as the decision to transform the South Atlantic into a Peace and Cooperation Zone (1986) and the country's economic crisis caused by disastrous exchange rate policies, represented a

severe blow to the promising weapons industry. It entered the 1990s with the collapse of companies of the stature of ENGESA. Ever since then — with the redefinition of the post-Cold War environment, with new threats as yet neither clearly assimilated nor defined and the ongoing transformation of concepts such as human safety — Brazil has lost its share in the market. Even light weapons such as the FAL MD97L military rifle cannot find buyers, because it is obsolete when compared to similar models produced in countries like the USA (Saint-Pierre and Mei 2007, 263).

Nevertheless, since the mid-1990s, the arms industry has regained some prominence with small firearms, demonstrating that the Brazilian strategy is no longer chiefly concerned with international projection, but with ensuring public safety. Nowadays, Brazil is the only Latin American country with significant production of weapons for police and civilian use (Dreyfus et al. 2005). Hence the paradox: investing in weapons for civilian use, regardless of whether or not they are exported, feeds violence back into the very society that produced them, generating greater social insecurity and often fomenting criminal activities, such as gun smuggling.<sup>5</sup>

### Light firearms: the only option for national industry?

Information technology has transformed warfare in terms of how weapons are produced and used: they have become high-precision systems. However, if in the case of interstate wars this has meant shorter periods of military activity, it has also meant less time for tactical and political decision-making. On the other hand, conflicts have acquired new dimensions: they are no longer confined to the army, the navy and the air force. They also encompass *outer space*, comprising electronics and cybernetics (Cruz 2006). However, in terms of weapons production, identification and dimensioning of potential threats and training, the Brazilian Armed Forces show no signs of preparedness to take the technological leap required to face up to new challenges.

The dismantling of the national weapons industry in the post-authoritarian period, when transformations in the international landscape generated new forms of warfare and internalized conflicts formerly staged on the international arena, disclosed the real ambitions of this country. Investment in armaments aimed at increasing exports and economic growth, i.e., erecting the new Armed Forces was never a priority. The Constitution of 1988 corroborates this hypothesis, since the preamble already states that the institution of the Democratic State is based “(…) on social harmony and a commitment to *the peaceful solution of conflicts*, both national and international, (...)” [italics added]. If it means that faced with conflicts, Brazil cannot resort to heavy armaments, why should it invest in such industry? The third argument sustaining the suggested hypothesis lies in the increase in the production

and export of light weapons for specific police and civilian use, instruments required for the solution of internal conflicts, precisely those that are currently growing fastest.

According to 2002 data, compared to its Latin American neighbours, Brazil accounted for 84% of light firearms exports. Taking 1998 as a baseline, it meant a rate of growth of almost 60% for the industry (Dreyfus et al. 2005, 28). However, when compared with other industrial sectors, weapons production is not significant. Out of the 5% of Brazilian industry represented by the machinery and equipment sector, the arms and other military equipment segment accounts for just 1.23%. Even then, the data show that it is an important factor for Brazilian exports. Maybe the most decisive explanation is that “the purchase and sale of weapons is never a straightforward commercial transaction. It is, by definition, a political procedure and, as such, reflects decisions taken at the highest level, for both the buying and the selling nation” (Pereira 1996). In contrast with its position regarding exports for exclusively military use, it is worth noting that the USA is one of the major customers of Brazilian light firearms, accounting for almost 90% of the orders for weapons up to .45 calibre. It is therefore possible to infer that the confidence shown in the production of this type of armament could well translate into a more general mutual trust between Brazil and the USA, i.e., into a strengthening of bilateral relationships and, possibly, into support (albeit veiled) for the supply of Brazilian weapons to countries seen as “friends” by the US State Department.

It seems that the pursuit of closer ties, via exports for the civilian market, aims at showing a degree of bellic preparedness that might place Brazil in a better relative position compared with other countries in the international community, because the exhaustion of weapons production and the decrease in investments in military S&T leave the country in an extremely vulnerable position. This generates foreign dependency for the supply of war materiel, compromising logistic autonomy and mobilization capacity. This constraint is further compounded by the increased technological lag of the national industry and the diversification of national security issues, especially in the Amazon region (Cruz 2006).

To provide the development required in S&T and for economic rationality, mobilization for defence and for peaceful purposes must be rendered compatible. The best way to achieve this relationship seems to be the development of a *production duality*, that is, to prioritize the convertibility of products, so that they serve both police and military purposes simultaneously. In other words, the best way forward consists in the parallel production of civilian products, so as to enable potentially oversized industrial plants to produce military products. In this way, dual production becomes an important tool for the reduction of spare installed capacity as well as for increased profitability.

The Brazilian Armed Forces boast wide experience in the development of dual technologies, and would contribute to an increase in national productive competitiveness, as well as to attracting additional resources from both the private sector and civilian R&D

institutions with which it has working partnerships. Note that the decree which instituted the National Defence Policy considered “the balanced strengthening of the national defence capacity as essential, relying on the decisive participation of the industrial, academic and techno-scientific sectors”. Furthermore, “scientific and technological development is essential for obtaining greater strategic autonomy and improving the operational capacity of the Armed Forces” (Brazil 2005). However, the existing partnerships are far from presenting the degree of symbiosis between civilian and military centres such as those observed in the 1960s and 1970s.

Until now, in the absence of political interest, companies producing light firearms have answered positively to the defence requirements of the nation, formulating conflict hypotheses that might serve as a parameter for the development of new models. This attitude, however, contrasts with the lack of strategic planning for the country, which civilian rulers seem to disregard, at best leaving such definitions in the hands of the Armed Forces, thereby transgressing the Clausewitzian maxim according to which “war is too important to be left in the hands of generals” (Mathias 2003).

One must not forget that the new era raises threats and discloses vulnerabilities for which the Armed Forces should be prepared. In this respect, it is crucial to identify and to evaluate the foreseeable threats and the vulnerabilities of the country with responsible courage and competence, so as to prioritize the most vulnerable sectors, given that it would be impossible to confront all the issues at once. However, there is a noticeable disregard for national strategic issues, most of which are confused with the necessary, but as yet unaccomplished score-settling with the authoritarian past. This sets this all-important debate on identifying and dealing with potential threats even further back. It seems that national defence and security are in a rudderless ship, which endangers the industry and compromises the ability of Brazilian citizens to decide what they expect from their Armed Forces (Villa 2004).

From an economic standpoint, the production of light weapons is almost exclusively focused on the foreign market, where it holds a consolidated market niche, but at the same time it still covers the demand of the domestic market, which represents but a fraction of the production. It is therefore necessary to evaluate the cost-benefit relationship for investments in the area. Specialists claim that the production and sale of light weapons, unlike of those for exclusively military use, stimulate social violence,<sup>6</sup> incurring in significant medical and social security costs, not to mention public safety. According to Phebo (2005, 16-17), “Brazil is the country with the largest number of firearm-related deaths in the world (...) The risk of dying from firearm projectiles in Brazil is 2.6 times higher than in the rest of the world and for the most part those deaths are the result of homicides”. Furthermore, “(...) firearms kill more male adolescents

than any disease, traffic accidents or any other external causes” (Phebo 2005, 20).

The cost of treating gunshot wounds is also significant. Phebo estimates that in Rio de Janeiro municipality, in 2002, between US\$ 36 million and US\$ 39 million were spent to cover the costs of firearm-related hospitalizations (Phebo 2005, 27). These figures cannot be generalized, not even to the south-eastern region of Brazil where Rio de Janeiro is located, as the city is one of the most violent in the country. Nevertheless, the machinery and heavy equipment sector profited just US\$ 37 million over the same period, a figure similar to the treatment costs for gunshot wounds — leaving aside costs referent to deaths and social assistance. What is more, the fact that military goods, weapons and ammunition represent a little over 1% of the machinery and heavy equipment sector, demonstrates that the relative profitability of weapons and other related products do not make up for the costs implied in owning and using them. It is therefore clear that light firearms are not the way forward for the Brazilian weapons industry (Dreyfus et al. 2005, 31).

## **Weapons, Defence and Regional Integration**

If the economic viability of bellic production is close to zero, perhaps Brazil should consider another way forward in order to continue investing in the defence industry, especially with regard to the production of light weapons and ammunition. The question is: how does this industry interfere in the relationship between Brazil and its neighbours?

In the case of Paraguay, once an important importer of Brazilian weapons, the industry has made a negative contribution to recent relations, because the former served as an intermediary for the acquisition of illegal weapons from the latter and this led to the cessation of exports.

On the other hand, it is well known that the weapons market basically operates through cartels, which hinders and even prevents countries like Brazil from expanding beyond its market niches, as attested in the 1980s: the dependence on exports of military equipment to the Middle East was pivotal for the debacle of the industry after the Iraq-Iran War ended. In order to overcome this obstacle, the country must direct its efforts to regions where more loyalty is guaranteed, but without this representing an exclusive or predominant market.

Several studies on the expansion of defence exports point to the South Atlantic countries and to South America as priority markets based on three factors: (1) these are countries at similar or lower development levels in relation to Brazil; (2) they are located within an area of immediate geopolitical interest; and (3) they maintain intense commercial and military relationships with the country, as stated by Admiral Montalvão (2002),

The defence industry of peripheral countries is hindered, because aside from the need not to lag too far behind state-of-the-art technologies, which are withheld and censured by the great powers, they have small and fragmented markets. There is no attempt at coalitions below the Equator. Industries this side of the Hemisphere continue to act as inhabitants of the Tower of Babel, despite sharing common needs and similar technological levels (...). Considering the trend towards the formation of common markets, initially confined to geographical borders, it is worth persevering with the ideal of forming a bloc that can be so wide as to overcome the oceanic obstacle of the Atlantic and the physical obstacle of the Andes, to include South America and West Africa. Equivalent intellectual development and similar needs can be seen as unifying factors. The recommended approach would enable the creation of a regional defence industry, because there would be a stronger and broader market to be served, the possibility of maintaining existing capacity and absorbing idle labour currently dispersed across unrelated activities.

This view is shared by his colleague, Admiral Vidigal (2002). Precisely with regional integration in mind, he stated:

Cooperation with other countries in South America, perhaps through a distribution of tasks, could form a market whose dimensions would be adequate to generate the economy of scale capable of sustaining the system [of defence production]. The elimination of potential conflict between the countries of our sub-continent gives rise to this prospect. Joint military R&D may create the critical mass of human and financial resources required to reduce the current technological gap with regard to the more advanced countries, allowing formulations that would enable us to effectively participate in the process use of state-of-the-art technology for the development of military power.

As mentioned in the “National Defence Policy” document, the priority when forging partnerships is geopolitical rather than economic, because Brazil aims both at becoming a regional leader and consolidating regional integration as part of the strategy of creating a Defence and Security system extensive to all South Atlantic countries.<sup>7</sup>

Brazil’s sovereign insertion in the international setting requires autonomy, giving it more leeway. This can be facilitated by means of the advocacy of multilateralism and the pursuit of regional integration, allowing the region to make consensual decisions and setting up a united front in international forums. The cooperation for the construction of a South American approach to defence would enhance the influence of the region with regard to other countries or blocs. It follows that the creation of bilateral and multilateral mechanisms of military cooperation with other South American countries should be considered, as well as with important West African partners, so as to intensify measures of mutual trust, which would consolidate political-strategic interactions (Cruz 2006).

In the Southern Cone, dialogue on safety and defence has evolved at a satisfactory pace, using the Mercosur structure as a launch-pad for military integration, with strategic studies symposia, agreements and memoranda regarding regional defence,<sup>8</sup> and joint military operations.<sup>9</sup> It is worth noting that since 2001, annual Meetings of the Army Commanders of the Southern Cone have been held. In the more recent meetings between the armies of Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay, it was agreed that increased military integration required a series of measures, among which the shared production of armaments for the common use of their armed forces and the sharing of S&T projects in this field.<sup>10</sup>

A concrete example of partnership is provided by the agreement between the Argentinean and the Brazilian Forces for the construction of a light, air transportable vehicle for military use. The prototype is well underway and should be unveiled by mid-2009.

Cooperation with Andean/Amazonian countries is incipient, but is likely to be boosted by the creation of the Union of South American Nations (UNASUL), proposed by the Cusco Declaration, signed by 12 countries on 8 December, 2004. The aim is to merge Mercosur and the Andean Pact into a single community in order to reduce trade barriers and strengthen the region's insertion within the global setting. As far as defence is concerned, in September 2004, the member-countries of the Amazon Cooperation Treaty Organization approved the Strategic Plan 2004-2012, which agreed on a set of collective military actions with the purpose of, if not overcoming, at least minimizing the threats faced by the region.<sup>11</sup> In the context of this Plan, several operations have already taken place, notably the sharing/selling of data produced by the Amazon Surveillance System (SIVAM), a Brazilian surveillance project using satellite-connected radars, enabling the control of the entire Amazonian air space.

In sum, regional integration opens up better prospects for the defence industry, and in the near future this could spell the reorganization of enterprises specializing in heavy weapons and more advanced technology. Recent steps towards the creation of a South American community enhance the possibilities for the formation of a multilateral defence force, which might lead the United States to reconsider its relationship with the region and with Brazil in particular. As Oliveiros Ferreira (2001, 42) noted, this is a pre-condition to "prevent the idea of suzerainty, which is how one should define the relations of the USA with Western Hemisphere countries, from gaining further ground".

However, regional integration has not been a straightforward process, subject to the whims of governments and even of military commanders. Nevertheless, the last 10 years have seen the construction of a consensus around the importance of the defence industry as a mechanism for bringing these neighbours closer together. They also share the view that this could act as a stepping-stone towards further confidence-building, which would promote regional development, maintain the peace and achieve the international insertion which South America deserves.

In other words, the promotion of integration has had to rely on the voluntarism of rulers and administrators, not unlike the process of setting up research and study institutions into technology and armaments. A comparison between the development of regional military integration policies with Argentina, Brazil's main partner on such issues, under the governments of Fernando Henrique Cardoso/Carlos Menem and Luiz Inácio Lula da Silva/Néstor Kirchner is more than enough to assess the role of political will with regard to regional integration projects (Mathias et al. 2008).

## Final Remarks

Of the hypotheses raised at the start, the first, suggesting that the Brazilian war industry was a consequence of S&T development, was fully confirmed. In fact, it was through the establishment of research centres, especially ITA, that development in defence and security was achieved. However, the same cannot be said of the second hypothesis. While there is strong evidence to suggest a minor institutional participation of the Armed Forces in the development of Brazil's weapons industry, it is equally true that also in the civilian ambit it is individual voluntarism that determines the pace of implementation of these decisions, as illustrated by the diverse attitudes of different Argentinean and Brazilian presidents since the Treaty of Buenos Aires (1990).

We have also sought to demonstrate that a conscious public policy for the development of Brazilian defence was never formulated. Even in the post-1964 period when war materiel manufacturing was intensely stimulated and new companies, mostly state-owned, were set up; even when national development plans were formulated, following the precepts of the National Security Doctrine — which, in turn, prioritized the development for security; even then, the fact that guidelines varied according to the President in office is proof of how the creation of the Brazilian arms industry has been accompanied by voluntarism.

The existence of this voluntarism with regard to development for defence in Brazil seems to show that the following lesson has been forgotten: there is a direct link between the development of new technologies and the transformation of military equipment and its deployment. From primitive stone weapons to modern sophisticated weapons systems, the interaction between technological innovation and the art of war have been symbiotic. Sometimes, war requirements have stimulated technological development; sometimes, civilian research has led onto military applications. There is no question that the Industrial Revolution was a turning point in this process, for changes have intensified ever since and, more importantly, as Alvin Toffler (1972) points out, the pace of such transformations has continuously accelerated

Last but not least, it is important to remind ourselves that the Armed Forces do not go beyond their role and control affairs best left exclusively to civilians, as a function of becoming more powerful or autonomous. On the contrary, this happens as a result of a lack of civilian command (Janowitz, 1967).<sup>12</sup> In this sense, when they take control of national development projects, they are filling the void left by civilians, always more concerned with their immediate individual gains than with the constitution of a national industrial complex that ensures small but promising profits.

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## Notes

- 1 Quoted by Lopéz (2001). The original document, as informed by the author, is “Aportes a un nuevo concepto de seguridad hemisférica–seguridad cooperativa”, which is based on keeping threats far from their possible targets through dialogue, since the State can no longer be considered the main actor. Document prepared by the Chair of the Committee on Hemispheric Security of the Organization of American States, May 1993, p. 2. Using much simpler language, the concept was mentioned in Comisión de la Seguridad Humana, Proteger y habilitar a la gente, UN, New York, 2003.
- 2 Information source: [http://www.ime.eb.br/index.php?option=com\\_content&task=view&id=30&Itemid=64](http://www.ime.eb.br/index.php?option=com_content&task=view&id=30&Itemid=64). Accessed on 16 June, 2005.
- 3 Some information about Embraer’s history is available at <http://www.embraer.com.br/portugues/content/empresa/history.asp>. Accessed on 13 June, 2007.
- 4 We could add small-scale manufacturers of guns and ammunition to the list, the most important of which appeared well before the years mentioned here. However, they produce defence materiel not with the intent of national development, but merely as companies seeking profits (like Taurus and CBC) or to maintain the capabilities and training levels for the Armed Forces (like Imbel).
- 5 Paraguay’s case is significant. Though a small country (7 million inhabitants) with no history of recent wars or high death rates caused by firearms, it has always been among the top ten importers of light weapons from Brazil. By analysing gun seizures on Brazilian territory, it was found that many had been previously sold to the neighbouring country, which indicated smuggling. This probably constituted the reason why arms exports to Paraguay were suspended in 2000. See Dreyfus et al. (2005, 40-41).
- 6 According to Dreyfus et al., in 2002, 70% of the guns apprehended in the state of São Paulo, had been made in Brazil (2003, 1).
- 7 As the document states: “The South American subcontinent is the regional environment in which Brazil is inserted. In its quest for deepening its bonds of cooperation, the Country visualizes strategic surroundings that go beyond the land mass of the subcontinent and includes projection

across the South Atlantic Sul to the African countries on its shores (...). As a consequence of its geopolitical situation, it is important for Brazil to deepen the process of integrated and harmonious development of South America, naturally extending to the field of regional defence and security (...). The regional integration of the defence industry, in the light of the example of the Mercosur, must be the object of measures that facilitate mutual development, the expansion of markets and the obtention of strategic autonomy.”

- 8 In 1997, a Memorandum of Understanding was signed between the governments of Brazil and Argentina to establish “a permanent mechanism of consultation and coordination” whose goal is to follow-up defence and international security issues of mutual interest. In 1998, the two countries signed the Agreement for the Constitution of a Common Security System in order to promote, among other aspects, the improvement of military cooperation. That same year, the establishment of a permanent mechanism for planning and follow-up of security and defence issues of common interest to Mercosur countries (including Chile and Bolivia) was determined. In November 2004, the Defence Ministers of the Mercosur and associates (Brazil, Argentina, Paraguay, Uruguay, Chile, Bolivia and Peru) signed the first agreement for “the construction of a common intelligence and the implementation of joint operations” to fight terrorism and drug trafficking. (Data taken from the paper “Mercosul: reflexos para o poder militar”, available at <http://www.ensino.eb.br/cee/publicacoes.htm>. Accessed January 12, 2005.)
- 9 Among which one can mention Operação Cruzeiro do Sul (performed annually by the Brazilian, Argentinean, Paraguayan and Uruguayan armies), Operação Laço Forte (performed annually by the Brazilian and Argentinean armies), Operação Prata II (performed in 2004 by the Brazilian and Argentinean air forces) and Operação Bogatun (performed by the Brazilian and Chilean navies). Also worthy of mention is the technical assistance provided by FAB to the Paraguayan Air Force. (Data available in Brazilian Army, Air Force and Navy official websites, [www.exercito.gov.br](http://www.exercito.gov.br), [www.fab.mil.br](http://www.fab.mil.br) and [www.mar.mil.br](http://www.mar.mil.br), respectively. Accessed January 16, 2005.)
- 10 Information taken from “Segurança Cooperativa na América do Sul”, prepared by Working Group 11 of the 5th National Defence Seminar. Available at [www.ensino.eb.br/cee/5\\_seminario.htm](http://www.ensino.eb.br/cee/5_seminario.htm). Accessed December 14, 2004.
- 11 Prior to the creation of UNASUL, Brazil was responsible for the bridge between Mercosur and the Andean Pact, since it was the only country to take part in both agreements. (“Países discutem segurança amazônica”, in *Gazeta Mercantil*, September 15, 2004.)
- 12 Relations between autonomy and control or subordination and command are thoroughly discussed in the specialized literature, constituting a model derived from Weber’s triads. We are not immune from this kind of analysis, as noted by Mathias (2004).

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