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PROSUB: A PUBLIC DEFENSE POLICY GEARED TOWARDS NEW INSTRUMENTS OF DETERRENCE

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ABSTRACT

Together, the Brazilian Submarine Development Program (*Programa de Desenvolvimento de Submarinos* – Prosub) and the Nuclear Program of the Navy (*Programa Nuclear da Marinha* – PNM) act in a double capacity: as a relevant public-defense policy designed to create credible deterrence tools, and as an extraordinary managerial, industrial, and technological challenge for the country. Their implementation has consumed many resources and required more than 30 years of persistence by various actors, operating in historical periods in which the country was governed by very different institutions. These programs also demand a decades-long allocation of significant public resources. Such a policy therefore deserves the most careful consideration. To this end, this research employed an adapted version of Kingdon's multiple-streams theoretical framework, with modifications suggested by other authors.

Keywords: Defense. Defense logistics. Nuclear submarine.

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INTRODUCTION

Defense is among the main concerns of any nation-state. According to Waltz (2001:159):

> With many sovereign states, with no system of law enforceable among them, with each state judging its grievances and ambitions according to the dictates of its own reason or desire – conflict, sometimes leading to war, is bound to occur. To achieve a favorable outcome from such conflict a state has to rely on its own devices, the relative efficiency of which must be its constant concern.

Public defense policies are among a state's various measures to ensure its own safety. According to Oliveira (2005: xxxiii, our translation):

> National Defense is a public policy whose objective is to ensure the means, doctrines, equipment, norms, preparation and all the necessary instruments for the defenseofthestate.War and peace are just like two sides of a coin: contrasting but inseparable.

Thus, it is common place – and, formany, even a survival imperative –for states to establish defense policies (GANSLER, 2007; DAGNINO, 2009 and ARCHULETA, 2016).

In Brazil, the National Defense Policy (*Política Nacional de Defesa* – PND) defines National Defense as:

> … the set of measures and actions of the state, with emphasis on the military field, for the defense of the territory, sovereignty and national interests against predominantly external threats, potential or manifest (BRAZIL, 2012:15, our translation).

Defined after the country's redemocratization in 1985, with the active participation of civil leaders, the National Defense Strategy (*Estratégia Nacional de Defes*a – END) can be considered the Brazilian state's first effective manifestation on national defense. It establishes as its first strategic guideline to "deter the concentration of hostile forces on land borders, within the limits of Brazilian jurisdictional waters, and to prevent them from using national airspace" (BRASIL, 2012a:11, our translation).

In respect to deterrence against hostile forces in Brazilian jurisdictional waters, the END defines the Brazilian Navy's (*Marinha Brasileira* – MB) hierarchy of strategic and tactical objectives. According to the document, the MB's priority is "… to secure the means to deny the use of the sea to any maritime concentration of enemy forces approaching Brazil" (BRASIL, 2012a:20, our translation). It further establishes that:

> To secure the goal of denying [enemies] the use of the sea, Brazil will have a large-scale submarine naval force made up of conventional and nuclear-powered submarines. Brazil will maintain and develop its ability to design and manufacture both conventionally propelled and nuclear-powered submarines(BRAZIL, 2012a:21, our translation).

Thus, in order to provide credence to an effective deterrence capability by the country's military forces, in addition to the requirement of a submarine naval force the END also determines the development and preservation of a national industrial and technological infra-structure for conceiving, designing, building and maintaining submarines, as well as their weapons systems, navigation, sensors and communications. In other words, the END indirectly determines that specialized components for submarine warfare should be developed, meaning two essential defense instruments, identified by Brick (2014) as the Armed Forces (*Forças Armadas* – FA) and the Defense Logistics Base (*Base Logística de Defesa* – BLD)[3]. The BLD reaches far beyond the scope of an Industrial Defense Base (IDB)[4], as it includes – among other components not considered in the IDB concept one that is particularly essential for the industrial defense base's proper functioning: adequate institutions and a competent professional technical staff, able to manage defense programs and procure defense systems.

To achieve these objectives, the Submarine Development Program (Prosub) was created in 2008. This long-term program represents a huge managerial, industrial and technological challenge involving many risks, most of which are yet to be identified. Moreover, the program has an

[3] The BLD is the aggregate technological, material and human capabilities needed not only to develop and sustain the military expression of state power, but also the industrial capacity and competitiveness of the country as a whole (BRICK, 2011).

[4] Formed by an integrated set of public and private companies and organizations, civil and military personnel able to perform or conduct research, design, development, industrialization, production, repair, conservation, revision, conversion, modernization or maintenance of defense products (*Produtos de defesa* – Prode) (BRASIL,2005:1).

estimated cost of approximately thirty billion BRL (PODER NAVAL, 2018), a large financial contribution from Brazilian society. For all these reasons, it must be carefully and continuously monitored.

The analysis of public policies is justifiable, since the political and intellectual evolution of democratic societies creates the need for vigilance over governmental actions and decisions. Besides, one should not forget that public policies are financed by society, via tax collection. Understanding why a certain decision was made and not another, or why a particular action was taken one way and not another, is yet another reason for society's justified interest in the state's behavior (RODRIGUES, 2013). Currently, the analysis of public policies is an important area of knowledge, with increasing application in various managerial spheres of human activities – not only within states, but also at the supra-state level(AZCONA & MARTINEZ, 2013, NASCIMENTO NETO et al, 2015 and MUÑOZ et al, 2013). Thus, this article's goal is to analyze the process leading to Prosub's creation, using one of the theoretical frameworks within the preexisting corpus of public-policy analysis.

In addition to this introduction, the article has four other sections. These condsection characterizes and describes the complexity of a nuclear submarine construction program, discussing this reality's implications for Prosub. The third section presents the rationale for adopting the modified Kingdon model as a framework of public-policy analysis. The various subsections of the fourth section analyze the processes that led to the development of deterrence instruments as a defense-policy requirement, based on a force of submarines and a BLD capable of providing it in an autochthonous manner. Finally, the third section presents our conclusions and final considerations.

THE NUCLEAR-POWERED SUBMARINE

Before approaching the process leading up to Prosub's implementation, it is important to summarize the concept of deterrence based on the use of nuclear-powered submarines. It is also a good idea to discuss some of the technological and managerial[5] characteristics specific to these artifacts, since these characteristics are relevant for the formulation of public defense policies.

[5] Martins Filho (2014) has addressed the issue of international relations, also relevant here.

The rapid technological development that took hold of military industry in the aftermath of World War II has continued in all environments (aerospace, land, sea, and underwater) where armed operations occur. Operations in the underwater environment, however, have a special distinction. Possession of attack submarines by an adversary significantly increases the risks and costs associated with employing naval forces in combat operations. This feature of submarines endows them with a significant deterrence capability. Nuclear-powered submarines differ from conventionally propelled ones (which require oxygen to generate power) in their ability to remain submerged – while maintaining high speeds for considerably longer periods of time. This trait further enhances submarines' deterrence power.

Programs to build nuclear-powered submarines involve protractedefforts, high risks and major management challenges (SHANCK et al, 2011). They also consume significant portions of the national budget, so decisions to implement them are often made at the highest levels of government, also requiring the approval of the respective parliaments or congresses.

Figure 1 compares nuclear submarines with other military artifacts. They are one of the most complex man-made artifacts in existence, considering their high cost, vast array of distinct technologies and components, and the human resources employed in their construction.

These are some of the reasons why, to this day, only five countries (United States, Russia, United Kingdom, France and China)[6] have opted to develop nuclear-powered submarines and were able to demonstrate their mastery of all the required technologies. Additionally, most of these technologies, particularly nuclear technology, are considered critical and strategic by their owners, meaning they are rarely sold or transferred. Therefore, a nuclear-powered submarine building program depends on the autochthonous development of most of these strategic technologies.

[6] India is still trying to join this select group.

Figure 1 – The complexity of the nuclear-powered submarine

Source: National Shipbuilding Research Program – Advanced Shipbuilding Enterprise (Authors' adaptation).

For all these reasons, Prosub's technological feasibility is based on three pillars, as we will discuss further:

a) Brazil's past experience in ship building and submarine assembly;

b) Brazil's dominance of the nuclear fuel cycle, as well as reactor design and construction;and

c) France's willingness to transfer to Brazil the technologies for the design and construction of the submarine platform, as well as supply the necessary components and subsystems (excluding the nuclear power-generation plant).

PUBLIC POLICY ANALYSIS

Broadly speaking, public policies are state actions that interfere in socia lreality and are intended to "satisfy the demands[7] directed to it by social actors or formulated by the agents of the political system themselves" (RUA, 1998:3, our translation). Public defense policies have the particularity

[7] … there are three types of public policy demands: those resulting from the emergence of new political actors, or from new problems; the recurring ones; and the repressed ones (which do not generate decisions) (Rua, 1998:3, ourtranslation).

of being recurrent, thus requiring ongoing attention from successive governments.

But who are the players in the game of public policy?

> Public policies are designed by political actors, who mobilize the necessary resources to carry them out while exercising their functions. Political actors can be individual or collective, and public or private (RODRIGUES, 2013:21, our translation).

Public administrators, judges, parliamentarians, bureaucrats, politicians, as well as government organizations and institutions are all examples of public actors.

One of the first and most widely used public policy analysis frameworks is the "policy process." Dye (2010:104) considers the policy process a model encompassing six stages: problem identification; agenda setting; policy formulation; policy legitimation; policy implementation; and policy evaluation.

Sabatier & Jenkins-Smith (1993[8]:3, apud Sabatier & Weible, 2014) are acutely critical of this framework. According to these authors, the model lacks a theory for addressing causation, i.e., testable hypotheses. Moreover, it suffers from descriptive inaccuracy and no concern for intergovernmental processes involving multiple levels of government. All in all, these shortcomings would ultimately lead to the effective absence of the role of analysis in the "analysis" of the policy process.

According to Metten et al:

> ... most criticisms refer to the fact that the approach is rather schematic and to its inability to portray and analyze situations in which two or more phases of the cycle are reflected, as seen in numerouspublic-policy case studies (METTEN et al, 2015:920, our translation).

Despite these criticisms, Sabatier & Weible (2014) conclude that the model is still applicable and has been partially incorporated in more up-to-date theories. For Metten et al (2015), a possible application of Dye's model is as a reference for situating the development stage of the public policy a particular analysis is focusedon.

[8] SABATIER, Paul A. & JENKINS-SMITH, Hank C. (1993), Policy change and learning: An Advocacy Coalition Approach. Boulder, CO: Westview Press.

Sabatier & Weible (2014) describe eight theoretical approaches to research on the public-policy process. The option for any of these approaches in a study is strongly dependent on the characteristics of the problem and the researcher's methodological preferences. Cairney & Heikkila (2014:363) suggest that one way to compare these various theories is to see how they address the six essential elements of the public-policy process: actors, institutions, networks or subsystems, ideas or beliefs, public policy context, andevents.

Kingdon has developed a methodology that is widely used in the analysis of public policies: the multiple-streams model.

Zahariadis (2014) presents a summary of this model, drawing attention to the fact that it deals with the phenomenon of the political process under conditions of ambiguity, or "a state of having many ways of thinking about the same circumstances or phenomena" (FELDMAN[9], 1989:5, apud Zahariadis,2014).

The multiple-streams framework is based on the "garbage can" model of organizational behavior (COHEN et al[10], 1972, apud Sabatier & Weible, 2014).

> Choice is conceptualized as a garbage can into which participants, who drift in and out of decisions, dump largely unrelated problems and solutions. No one person controls the process of choice, and fluctuating attendance, opportunities, and attention give the process highly dynamic and interactive qualities (ZAHARIADIS, 2014:27).

Under such conditions, "theories based on rational behavior are of limited utility," and problem definitions are "vague and shifting." Thus, "distinguishing between relevant and irrelevant information" becomes "problematic" (ZAHARIADIS, 2014). Decisions are made by allocating attentionviaactivationorbyovercomingtemporalconstraints. Theprocess is usually sensitive to the level of decision-making effort and to the amount of problems that have to be solved. "Who pays attention to what and when is critical. Time is a unique, irreplaceable resource, whose supply is totally inelastic."

[9] FELDMAN, Martha S. (1989), Order Without Design: Information Production and Policy Making. Stanford, CA, Stanford University Press.

[10] COHEN, Michael D., MARCH, James G., OLSEN, Johan P. (1972), "A garbage Can Model of Organizational Choice". Administrative Science Quarterly, 17:1-25.

Policy changes occur when a window of opportunity merges the three distinct streams (the problem stream, the politics stream, and the policy stream).

"The problem stream consists of various conditions that policy makers and citizens want addressed… Policy makers find out about these conditions through indicators, focusing events, and feedback." (ZAHARIADIS, 2014:70). The politics stream encompasses the national political environment, which may include public opinion and partisan control of public institutions. "Finally, the policy stream consists of ideas and solutions, developed by experts and policy specialists, waiting to be implemented" (NOWLIN,2011).

The multiple-streams framework is based on three assumptions (ZAHARIADIS, 2014):

a) Individual attention or processing is serial (individuals can only attend to one issue at a time), while systemic attention or processing is parallel (the division of labor inorganizations or governments enables them to attend to many issues simultaneously);

b) Policy makers operate under significant time constraints; and

c) The streams flowing through the system areindependent.[11]

According to Zahariadis (2014), this framework contains five structural elements: problems, policies, politics, policy windows, and policy entrepreneurs. Figure 2 illustrates Kingdon's multiple-streams framework.

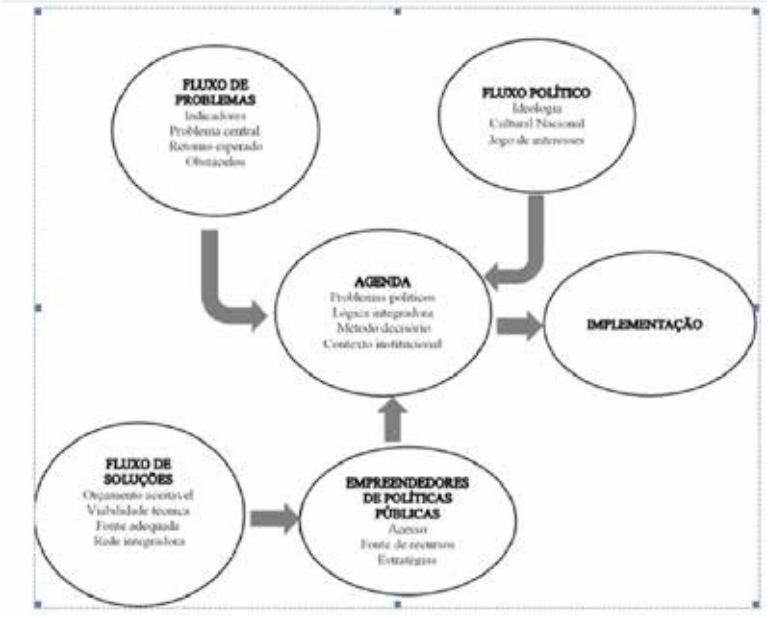
Kingdon'smodelalsoreceivescriticism,someofwhichassociated with the abovementioned structural elements. Zahariadis (2014) points out that the model's streams are not really independent: in practice, they merge and are subjected to reciprocal influences. The author also suggests that the model does not explicitly adopt an institutional language, in which organizations, for instance, could be included as policy-process actors. Nowlin (2011) raises similar objections, which led to the proposition of a revised model based on the work of Ness (2010) and Ness & Mistretta (2009) on public policies foreducation.

This revision involves the inclusion of institutional factors, designated as the "policy milieu." This contemplates institutions within the government structure. This inclusion is particularly important in

[11] Even though they are not completely independent, each can function autonomously. However, they must merge at some point, so that a problem can become a public-policy object.

the case of defense policies, which are heavily influenced by the Armed Forces. The revised model also expands the policy stream into a "policy field" that includes the problem stream (NOWLIN,2011).

Figure 2: The multiple-streams model



Source: Zahariadis (2014) (Authors' adaptation)

Moreover, the revised model shifts its focus from setting the agenda to designing and formulating public policy. Policy entrepreneurs, now located in the broader "policyfield" stream, seek to merge the distinct flows in order to ensure that the preferred policy is implemented (Ibidem).

This approach solves the most common criticisms of the model, and is particularly adequate to defense policies since, as previously discussed, this type of policy deals with problems that are ongoing and thus must be a permanent fixture of the governmental agenda. For these reasons, this paper adopts the revised multiple-streams model.

THE LONG JOURNEY TO WA RDS THE IMPLEMENTATION OF PROSUB AS A DEFENSE POLICY

The effort to approve a nuclear-powered submarine building program has a history of over 30 years. In this trajectory, the problem stream and the policy stream have undergone several distinct periods, in which political institutions with very different characteristics evolved:

a) From the military regime to the 1985 redemocratization;

b) From redemocratization to the first direct presidential election, after the promulgation of the 1988 Constitution;

c) From the first direct presidential election until the creation of the Ministry of Defense (MD) in 1999; and

d) The period after the creation of the MD.

Each of these periods should be analyzed separately.

Prior to the creation of the MD in 1999, the three streams as well as the relevant policy entrepreneurs were almost exclusively within the Ministry of the Navy (MN). In terms of defense policies, the participation of the upper echelons of government and the National Congress was practically non-existent.

This situation made it difficult to approve a program of Prosub's size, which required a substantial financial resource allocation over a long period of time. Such a portentous allocation was far above the MN's budgetary possibilities.

Thus, the activities carried out during the first three periods fit well within the problem stream and the policy (or policy-field) stream. Hampered by the institutional context, however, these activities fell short of generating a politics stream.

FROM THE MILITARY REGIME TO THE 1985 REDEMOCRATIZATION

Prosub's creation occurred in the midst of military rule. In 1976, the Admiralty ordered Captain Othon Luiz Pinheiro da Silva to take a Nuclear Engineering course at the Massachusetts Institute of Technology (MIT) (CORRÊA, 2010:77). He would later become the foremost public policy entrepreneur in favor of the creation of nuclear-powered submarines and their use as deterrence tools.

From an institutional point of view, the country was in a military-controlled state of exception, lacking a national and integrated defense planning. The Brazilian Navy had complete autonomy to define and implement public policies it considered sound in terms of naval strategy.

In March 1977, President Ernesto Geisel broke with the Brazil–United States [Military] Treaty, which had been signed in 1952, in the context of the Cold War. Brazil was thus forced to devise a self-defense strategy separated from American interests.

The hypothetical war scenarios of the time, however, did not entail specific deterrence instruments (MARTINS FILHO, 2014 and NOGUEIRA,2014). In any case, this event undeniably opened the door for more ambitious conceptual flights by Brazilian strategists. Thus, in 1979, the creation of said deterrence instruments became a part of Brazilian Naval Strategy:

> … Minister Henning, in a meeting with the Admiralty, approved that the Navy would begin activities in the nuclear area, with the participation of Commander Othonin the Air Force's uranium enrichment program, whose … enrichment methodology [would be] laser-based.After participating for three months in research conducted at the Aeronautics Technology Center, he concluded that, to produce appreciable amounts of enriched uranium, such a methodology would require a 10-year horizon. In June 1979, he suggested to the EMA[12] that development should begin on an ultracentrifugation [enrichment methodology], with the support of other research institutions. In July 1979, under Admiral Maximiano's administration, the first resources were allocated to the Navy's secretive uranium enrichment project (BRASIL[13], 1990:4–6, apud Nogueira, 2014:89, our translation).

Brazil was now looking to obtain a convincing deterrence capacity in the form of nuclear-powered submarines. "In December 1981, the construction of the first ultracentrifuge was completed … this was Brazil's first concrete step in the autonomous production of nuclear technology"

[12] *Estado-Maior da Armada* (Armada Chief of Staff).

[13] BRAZIL, (1990), Final Report of the Joint Parliamentary Committee of Inquiry, to inquire into the autonomous nuclear energy program, also known as the parallel program. Brasília, DF. Available from: <http://www2.senado.leg.br/bdsf/bitstream/handle/id/194598/CPMIprogramanuclear.pdf?sequence=6>. Accessed on: August 16, 2013.

(CORRÊA, 2010:81, our translation), allowing the first uranium isotope enrichment experiment to be successfully carried out in September, 1982 (NOGUEIRA, 2014:198).

On October 17, 1986, the Navy created the Coordination for Special Projects (*Coordenadoria par aProjetos Especiai s*– Copesp), an embryo of what in 1995 would become the Navy Technology Center in São Paulo (*Centro Tecnológico da Marinha em São Paulo* – CTMSP), where the PNM program is developed. The PNM trains qualified professionals in the technological, industrial and operational processes of ship propulsion-related nuclear installations (FONSECA JR,2015).

This period also witnessed the creation of a program for the construction of conventional submarines, under Ministers Maximiano da Fonseca's and Alfredo Karan's administrations. The construction contract, signed with the German shipyard Howaldtswerke Deutsche Werft (HDW), provided for the fabrication of two submarines (one in Germany, the other in Brazil), with a clause for the construction of two additional units, both in Brazil.

During this phase, Admiral and Ministers Azevedo Henning, Maximiano da Fonseca, Alfredo Karan and Mario Cesar Flores – as well as Captain Othon, who would later become Admiral – appear as the main actors for the creation of a deterrence capability based on nuclear-powered submarines.

The favorable context, in addition to the fact that the institutions of the time allowed for autonomous decisions by the holders of military ministries, was marked by the perception that only by developing its own nuclear technologies could Brazil aspire to have an effective maritime deterrence capacity. Such a perception was justified by the strong opposition of the United States government to the German-Brazilian Nuclear Deal.

These two programs fit into the policy stream and were critical to Prosub's technical feasibility, as explained in the second section.

FROM REDEMOCRATIZATION TO THE FIRST DIRECT PRESIDENTIAL ELECTION, AFTER THE PROMULGATION OF THE 1988 CONSTITUTION

With Tancredo Neves 'death, José Sarney assumed the presidency. Sarney kept Admiral Henrique Saboia, who had been chosen by Tancredo himself, as Minister of theNavy.

Even though the country now had a civilian president, the Brazilian Navy kept its autonomy to develop public policies at its own discretion, limited only by budgetary constraints.

As we have seen, Prosub's public policy field had advanced a great deal during the previous period. A naval deterrence strategy using nuclear submarines had been defined, and steps had been taken to develop the technologies essential for the design andc onstruction of a nuclear reactor, as well as conventional submarines. These measures led to effective advances in respect to many necessary technologies, training of qualified personnel, development of industrial and research facilities, as well as the qualification of numerous national companies to make up a future production chain for the construction of submarines and their subsystems.

The Navy attempted to provide continuity to the policy stream by beginning construction on the submarines "Tamoio" (1987), "Timbira" (1988) and "Tapajó" (1990) and by developing the project of the first national submarine (SNAC-1). However, the project was compromised by the unfavorable economic conditions and by a lack of human resources (NOGUEIRA,2014:99).

The PNM also made important advancements. In the early 1990s, it had about 680 internal engineers, plus another 300 from IPEN's Reactor Research Department (SANT'ANNA, 2004).

However, this stream was not sufficient to put the nuclear submarine development program on the agenda, making it impossible to open a window of opportunity. Three factors contributed to block the politicalstream. (1) Many of the politicians who came into power harbored fears or prejudices about defense matters. (2) Similarly, the civilian elite had a complete lack of knowledge about defense-related issues, which were always conducted by military leaders in their respective ministries. The first movements in the Brazilian academy to study defense problems date back to 1985, when strategic study centers were created at the

Universidadede Campinas (*Núcleo de Estudos Estratégicos* – NEE) and at the Universidade Federal Fluminense (*Núcleo de Estudos Estratégicos* – NEST). (3) The government faced huge macroeconomic imbalances in the form of rampant and uncontrolled inflation, as well as a large foreign debt.

FROM THE FIRST DIRECT PRESIDENTIAL ELECTION UNTIL THE CREATION OF THE MINISTRY OF DEFENSE IN 1999

When Fernando Collor de Mello took office in 1990, the political stream – which had been neutral until then – suffered a major setback, negatively affecting the other two streams. In a statement to Martins Filho, former Collor Navy Minister Admiral Mário César Floressaid:

> I had the necessary influence to prevent the [nuclear submarine] project from falling into complete ostracism. President Collor was definitely not sympathetic to the project; he had his political, foreign-policy reasons. He never showed himself peremptorily contrary [to the program], but never expressed enthusiasm either (MARTINS FILHO, 2011).

Thus, a contrary political stream led to the stagnation of the policy flow.

President Collor's impeachment and substitution by Itamar Franco hardly improved the situation, since the new minister of the Navy had other priorities for the Force. "With the replacement of Admiral Flores by Admiral Serpain the Navy ministry… it was decided that Navy resources allocated to the PNM were to be reduced" (NOGUEIRA, 2014:200, ourtranslation).

The election of President Fernando Henrique Cardoso (FHC) in 1994 did not significantly improve things either. Fiscal problems and foreign debt loomed over the government, even though 'Plano Real' was already having success at inflation control. However, at least the political stream returned to a state of neutrality.

On the other hand, there were institutional changes with positive effects for the defense sector. The Comission for Foreign Relations and National Defense (*Comissão de Relações Exteriores e Defesa Nacional* – CREDEN) was created in the House of Representatives. The Government

Council (Decree No. 1,895, of May 6, 1996) was also instituted. In 1996, the first National Defense Policy (*Política de Defesa Nacional* – PDN) was approved. It explicitly mentioned the need for deterrence. The problem stream, initially impelled by the Navy, gained higher status in the state hierarchy.

During FHC's second administration, new structural changes took place. The most important was the creation of the Ministry of Defense by Complementary Law 97, of June 9, 1999, leading to the extinction of the four separated military ministries. This marked the beginning of a new period, in which the defense institutions typical of any democratic state had finally been created.

AFTER THE CREATION OF MINISTRY OF DEFENSE

The second FHC government faced countless crises, both internal and external. This had a significant impact over the country's economy. The dire political situation did no favor to defense matters. Additionally, the Ministry of Defense, still in the process of being structured and now under civilian command, was yet to find a way to participate in substantive defense-related decisions.

However, the Navy (now transformed into the Navy Command) regained the capacity for working within the policy stream. Aware that a program to build a nuclear submarine would require resources far in excess of what it was receiving, the Force opted to keep the PNM in a vegetative state while seeking new government resources. It also sought to preserve the capacity for building and maintaining conventional submarines, which fulfilled more immediate needs:

> As for submarine construction, besides the construction of Tikuna, Admiral Chagasteles … established guidelines for the conventional submarine project, known as the S-MB-10 Brazilian medium submarine … [this] amounted to the revival of the SNAC-1, with modifications to make it as similar as possible to the SNAC-2, becoming an intermediary between the Tikuna and the Nuclear Attack Submarine (NOGUEIRA, 2014:141, our translation).

The October 2002 presidential election, won by Luiz Inácio Lula da Silva, from the Workers' Party (PT), was a landmark for Prosub – since

the party was favorable to indigenous industrial development and a strong national defense. However, despite some initiatives in the areas of industrial and defense policy, Prosub[14] did not make significant progress. In any case, some activities had been successfully developed, including:

> The conclusion, at the CTMSP, of the final assembly of the pressure vessel and internal components of the LABGENE reactor, and supply of uranium enrichment centrifuges to the Brazilian Nuclear Industries (*Indústrias Nucleares do Brasil* – INB)… The maritime launch of the "Tikuna" submarine on March 9, 2005 and its incorporation into the Navy on December 16 of the same year (NOGUEIRA, 2014:155 and 158).

In President Lula da Silva's second term, starting in 2006, this scenario changed radically. The country's economic situation had improved, resulting in a positive commercial balance and the accumulation of currency reserves. The 2006 discovery of the Tupi Oil Field (later renamed to Lula Oil Field) in the Campos Basin generated promises of wealth together with concerns regarding the defense of this portentous heritage. This event significantly reinforced the problem stream, insofar as a need to protect these richesemerged.

On March 1, 2007, Squadron Admiral Julio Soares de Moura Neto was sworn in as Navy Commander and immediately reinstated the nuclear submarine development project as apriority.

> The Nuclear Program of the Navy is worthy of mention; it began in 1979 and has made considerable progress, even though its resources are limited to those of the Force itself. For the completion of the Program, additional budgetary grants are indispensable. Once these steps have been successfully completed and pending a government decision, we will have the necessary conditions for the commencement of project design and subsequent construction of a nuclear-powered submarine (MOURA NETO, 2007, our translation).

[14] Normative Ordinance No. 899, establishing the National Defense Industry Policy (*Política Nacional da Indústria de Defesa* – PNID) and the new National Defense Policy, in 2005.

The Navy Commander was very aware that without a favorable political stream Prosub would be unfeasible.

The following year, at the invitation of Defense Minister Waldyr Pires, President Lula da Silva visited the CTMSP and was impressed by the program's breadth, despite the scarce resources at that point allocated by the central government. This opened a window of opportunity for merging the three streams. During the visit, President Lula da Silva assured Admiral Bezerril, director of the CTMSP, that an amount of BRL 1.04 billion would be made available over the next eight years – or approximately BRL 130 million per year – so the Navy could complete its project of nuclear propulsion installations for submarines. Thanks to these resources, the work on LABGENE was accelerated, and the construction of the Uranium Hexafluoride Production Plant proceeded. This set ground zero for the inclusion of the future Submarine Development Program in the national agenda.

The insertion of the nuclear issue on the national defense agenda is transparent in President Lula da Silva's speech for the occasion of Nelson Jobim's empowerment as Minister of Defense on July 25,2007.

> … the Navy, as the only [actor] with the definite goal of building the nuclear submarine, continued its project. Even though Brazil is the owner of the most important uranium enrichment centrifuge technology in the world – in a visit to Aramar what you'll see is a source of pride for the Brazilian people – for years and years the Navy has lacked the necessary resources to finish the whole process. Well, we have now decided that from next year's budget onwards … BRL 130 million per year [will be allocated], based on the perspective that in 8 years the entire process will be finished and we'll be prepared to take the nextsteps (LULA, 2007, our translation).

In the second half of 2007, the Navy Commander held apresentation, watched attentively by President Lula, on how process completion on the design and construction of the nuclear-powered submarine was being envisioned. At the end of the explanation, and after many discussions, which included budget numbers, the Minister of Defense asked the President, "So, President, are we going ahead?" President Lula da Silva answered: "Let's move forward!" (MOURA NETO, 2012, our translation). The political stream finally merged with

the policy stream. The next step was to complement the policy stream, in order to achieve the program's objectives.

For Moura Neto (2012), Brazil could no longer waste time, as the process started in 1979 had no end insight. Some prerequisites had already been fulfilled, such as domain over the nuclear fuel cycle, but the ability to design submarines (obviously a fundamental one) had not yet been acquired – even though the Navy Arsenal had already built conventional submarines using German technology.

In a way, the decision to look for a strategic partner was a no-brainer, both politically and technically.

> France employs typical Western methods and processes, which facilitates their absorption by Brazilian engineers and technicians. Besides, the country is a traditional supplier of war material to the Western world and was willing to sell its submarine design technology, excluding the project and construction of the reactor and its controls. Furthermore, due to the number of submarines that had to be built, France was willing to provide Brazil with a vast nationalization program, aiming to increase the Brazilian participation in submarine production and prepare the national industrial base for future projects of the same nature. These were the differentials in favor of the partnership with the French (BRAZIL, 2013a:19, our translation).

Concluding the political stream, a September 6, 2007 Decree by President Lula da Silva established the Ministerial Committee for Formulation of the National Defense Strategy (END). On December 18, 2008, Decree 6703 approved the END, which had been formulated by Ministers Nelson Jobin, from Defense, and Mangabeira Unger, from the Secretariat of Strategic Affairs. The END includes Prosub-related objectives among its overall goals, as discussed in this article's Introduction.

Deployment began very quickly, by means of the following actions:

> … on December 23, 2008, President Sarkozy came to Brazil and met with Lula in Rio de Janeiro's Copacabana Palace, where a strategic partnership between Brazil and France was signed to develop the submarine's construction project … That same day, two complementary agreements were also signed:

> one between the two Defense Ministers – Nelson Jobin and Hervé Morin – and one between the two Navy Commanders – me and Admiral Forissier. An umbrella agreement was also signed between the Directorate General for Materials and the DGA, DCNS, so work could commence.
> … trade agreements were approved by the two presidents in September 2009, on the occasion of President Sarkozy's visit for the September 7 celebrations. So, on that date, Brazil's trade agreements with the DCNS were signed, and the DGMM was the one carrying the flag.
> … In early 2010, or January 2010, practically, the Ministry of Finance approved the trade agreements and thus they came into force…So, let's see, we really started to work on this in January 2010 (MOURA NETO, 2012, our translation).

The contracts provide for the fabrication of four conventionally powered submarines (one in France and three in Brazil), besides one nuclear-powered submarine. It also predicts the construction of submarine manufacturing and maintenance facilities, supply of technology for submarine design and construction, equipment, materials and parts for the construction of the five submarines (except in regards to nuclear power generation facilities). The PNM will be responsible for designing and producing the submarine's nuclear powerplant.

Thus, the three streams were finally merged and the submarine development public policy was successfully included in the country's agenda, backed by the proper allocation of resources. Under Prosub's initial schedule, the four conventionally propelled submarines were to be launched in 2018, 2019, 2020 and 2022. The nuclear submarine was scheduled for 2025. This was followed by numerous actions such as: hiring and training staff in France; construction of a naval base and ship yard (ICN – *Itaguai Construções Navais*, in partnership with Odebrecht Defense) for the building and maintenance of submarines; construction of the Metallic Structures Manufacturing Unit (*Unidade de Fabricação de Estruturas Metálicas* – Ufem); and creation of AMAZUL – Amazônia Azul Tecnologias de Defesa S.A. by Law No. 12,706 of August 08, 2012 (to develop and maintain the necessary technologies). In parallel, the Navy is developing a certification program for a national logistics chain, enabling the logistical defense basis to meet Prosub's needs with national products.

Thus, Prosub was implemented to meet the objectives of creating two essential defense instruments, establishing a deterrence strategy based on the use of conventional and nuclear-powered submarines.

CONCLUSIONS AND FINAL CONSIDERATIONS

This paper sought to analyze the process of conceiving and implementing a public policy to create a conventional and a nuclear-powered submarine force, as well as a national logistical defense basis capable of conceiving, designing, building, maintaining and disabling submarines, including the operation of weapon systems, navigation, sensors and communications – all essential tools for an effective deterrence capacity. The analysis was based on a modified version of the Kingdon multiple-streams model. These modifications were fundamental toallow for the application of the model to a public defense policy. To wit:

a) The explicit consideration of organizations within the institutional environment, in this case the BrazilianNavy;

b) The consideration of the interdependence between the problem stream and the public-policy (or policy) stream.

Considering the six structural elements of the Kingdon model, the analysis concluded that the problem stream was influenced by the March 1977 break with the Brazil–United States Treaty and the strong US government opposition to the German-Brazilian nuclear deal. These events led the Navy to include the need to develop an indigenous, submarine-based deterrence capability as part of its strategy. The 2006 discovery of pre-salt oil further aggravated the defense situation.

The policy stream benefited from Captain Lieutenant Othon's 1976 nuclear energy studies at MIT. The reports of the Armed Staff Officer led to the creation of the PNM in 1979. It was financially supported by the Navy itself, until President Lula da Silva's declared his support in 2007. At the same time, the Navy sought to develop and build diesel-electric propulsion submarines inBrazil.

The political stream was compromised by the Brazilian institutional backwardness in constructing the institutions that carry the burden of defense. These must be present in any modern democratic country under the rule of law. In the interval between the promulgation of the Brazilian Constitution of 1988 and the creation of the Ministry of Defense in 1999, the Navy alone was dedicated to the formulation of a

public policy for submarine-based deterrence. This situation inexorably prevented the program's advancement. The first directly elected president under the 1988 Constitution, Fernando Collor de Mello, clearly did not support the policy. With Itamar's Minister of the Navy, it was very much the same story. This lack of support led to the near-immobilization of the problem and policy streams. The creation of the Ministry of Defense, as part of the political stream, completed the process of establishing a democratic regime's minimal set of national defenseinstitutions.

President Lula da Silva's election heralded a more favorable posture in regards to indigenous industrial and technological development. It also brought forward the possibility of a defense compatible with the economic, demographic and territorial size of the country. Lula's election was decisive for the inclusion of defense matters – and Prosub in particular – in the government agenda.

The window of opportunity that enabled the three streams to merge occurred between 2007 and 2008, after President Lula da Silva's visit to the PNM facilities in Iperó, São Paulo. The president determined the release of funds for the program, the elaboration of the National Defense Strategy and a rapprochement with France to constitute a strategic partnership able to make Prosub feasible from a technological and financial point of view.

This analysis considered only part of the public policy cycle as defined by Dye (2010:104): problem identification, agenda setting, policy formulation, policy legitimation, policy implementation, and policy evaluation. Because the Prosub policy is still under development,substantial portions of implementation and evaluation could not beanalyzed.

This analysis considered the elements mentioned by Cairney and Heikkila (2014) to identify the particular features of the Prosub policy and the Brazilian situation.

Brazilian defense institutions have evolved considerably in the more than three decades during which the issue of deterrence has been a concern for policy entrepreneurs. Likewise, the inclusion of the Navy in the model's institutional environment was fundamental, fully justifying the adoption of a modified Kingdon model.

Because the subject has been dealt with for decades strictly within the context of the Navy, the problem and policy streams cannot be considered independent. This also justifies our option for the modified model.

Undoubtedly, the policy's main political entrepreneur was President Lula da Silva. Other public policy entrepreneurs include all ministers or commanders of the Navy since 1976, except Admiral Serpa, who did not support the program.

Finally, the most relevant events for making Prosub viable were the break with the military agreement between Brazil and the US in 1977, the promulgation of the 1988 Constitution, the creation of the Ministry of Defense in 1999, and the elections of President Lula da Silva in 2002 and 2006.

PROSUB: UMA POLÍTICA PÚBLICA DE DEFESA VOLTADA PARA A CRIAÇÃO DE INSTRUMENTOS DE DISSUASÃO

RESUMO

O Programa de Desenvolvimento de Submarinos (Prosub) e o Programa Nuclear da Marinha (PNM), em conjunto, constituem, a um só tempo, uma relevante política pública de defesa, destinada a criar instrumentos críveis de dissuasão e um extraordinário desafio gerencial, industrial e tecnológico para o país. Sua implementação consumiu muitos recursos e exigiu mais de 30 anos de persistência de vários atores, que atuaram em períodos em que o Brasil funcionou sob instituições muito distintas. Adicionalmente, demandará a alocação de expressivos recursos públicos durante várias décadas. Trata-se, portanto, de uma política que merece ser analisada com muita atenção. Para tal, foi utilizado o arcabouço teórico dos fluxos múltiplos de Kingdon, com modificações sugeridas por outros autores.

Palavras-chave: Defesa. Logística de defesa. Submarino nuclear.

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