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The Brazilian 'Blue Amazon' Program: A new chapter for submarines nuclear-powered international domain?[1]

El Programa "Blue Amazon" brasileño: ¿Un nuevo capítulo para el dominio internacional de los submarinos de propulsión nuclear?

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Abstract: This paper seeks to analyze the currently existing international rules governing the usage of nuclear-powered submarines and its application towards the Brazilian program announced in 2018 of a national fleet investment in nuclear technology to strategically defend its coastline, 'the blue amazon', bringing the world's attention to the nuclear development by new global State actors and a non-permanent member of the United Nations Security Council. This paper examines the project's (in) compatibility to vital international legally documents rests in the discussion, mainly, the Model Additional Protocol of the International Atomic Energy Agency (IAEA) - safeguards agreements - still not ratified by the Brazilian government and regional agreements align with South States, e.g Argentina, which restricts nuclear technology usage by other member States.

Keywords: Nuclear-Powered Submarines, Treaty on the Prohibition of Nuclear Weapons, Nuclear Safeguards.

Resumen: Este artículo busca analizar las reglas internacionales que rigen el uso de submarinos de propulsión nuclear y su aplicación hacia el programa brasileño anunciado en 2018 de una inversión en tecnología nuclear para defender estratégicamente su costa, 'la Amazonía azul', lo que atrajo la atención mundial al desarrollo nuclear por parte de nuevos actores estatales globales y un miembro no permanente del Consejo de Seguridad de las Naciones Unidas. Este documento

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examina la (in) compatibilidad del proyecto con documentos jurídicos internacionales vitales que se encuentran en discusión, principalmente, el Protocolo Adicional Modelo de la Agencia Internacional de Energía Atómica (OIEA) - acuerdos de salvaguardias - aún no ratificado por el gobierno brasileño y los acuerdos regionales que se alinean con Estados del sur como, por ejemplo, Argentina, que restringe el uso de tecnología nuclear por otros Estados miembros.

Palabras clave: Submarinos de propulsión nuclear, Tratado sobre la prohibición de las armas nucleares, Salvaguardias nucleares.

1. Introduction

Brazil's growing ambitions of enhancing naval power in the South Atlantic may put an end to decades of peace and anti-nuclear policy strategy. The Brazilian sea has eight and a half thousand kilometres of coastline and the recently announced expanded naval program with nuclear-powered submarines on the spotlight intends to secure the region by rising Brazil as America's sub-regional nuclear power. The Blue Amazon campaign, announced in the mid and late 2000s, is an essential source of natural wealth, historical, and cultural heritage of inestimable value to Brazil. Submarines, as part of a defence approach related to the recent discovery of substantial oil reserves on and off the Brazilian continental shelf, suggest new significant changes for rising powers to deal with maritime spaces acquisition. The nuclear-propelled submarines geared at the South Atlantic zone of peace and cooperation revival, dated to Cold War era, as the project strengths the region's naval dissuasion power to face threats of external actors present in the region, despite decades of Global South's non-nuclear foreign policy establishment.

The Blue Amazon corresponds to the marine soil, the subsoil of the extended continental shelf, and the water mass of the exclusive economic zone up to 200 nautical miles from the baselines of the territorial sea. The monitoring system of the region is the Blue Amazon management system (2008), made of remote sensors, strategically distributed on four and a half million km². The radars and sensors are along the coast, on the islands, and the platforms receive the reinforcement of aerial, surface and submarine surveillance. This growing presence of external emerging powers in the region enjoys a lacking common South Atlantic identity, weakening the region's power of dissuasion in case of an attempt of invasion, questioning Brazil's ability to flex its understandings of sovereignty and autonomy in pursuing international goals and cooperation with its neighbouring states with nuclear wide-ranging technologies. The case is a credible project for Brazil to regain access to the global nuclear governance form and investment networks necessary to advance its national technology agenda.

The external intervention in the region by the new Brazilian government is questioned, particularly NATO's role and Russian proximity toward the South. If accepted, 960.000 km² will join the exclusive economic zone of Brazil, reaching four and a half million km², being the continental shelf extended up to 650 km. The project to survey the Brazilian continental shelf, therefore, is of immeasurable importance for military capacity expansion in the region.

To have nuclear submarines, the country must produce its fuel as they cannot trade it, except for civil reactors. Brazil's pace of progress picked up significant speed from 2008 onward when the government invested in nuclear-propelled submarines by launching the marine nuclear program and the Submarine Development Program (PROSUB). After four decades of the country's commitment to the development of indigenous technology for naval nuclear propulsion, economic recession exposed the economic frailty of the Brazilian State, and steep cuts affected budgets across the board, casting a long shadow over the program's viability. The new scenario reached after the elections of 2019, the technology and the equipment placed in the hands of the country's navy became a major treasure explored. The technology brings higher speed and efficiency to the marine defense ships, implemented in cooperation with France, giving technical help in the non-nuclear components of the submarine. Yet, the technology requires assurances of its peaceful use and how (if possible) it would be appropriate to speak of the peaceful use of a military submarine.

The project raises many questions on the fuel that would use in nuclear submarines. The Nuclear Non-Proliferation Treaty (NPT) binds States to a series of activities that must hold a previous safeguard agreement sent to the International Atomic Energy Agency (IAEA), not included in the list of the technology adopted by Brazil for the promotion of nuclear fuel. The Agency plays a vital role in the development of safety standards, nuclear security guidance, and relevant conventions based on best practices. However, some contested methods adopted by the IAEA, as the international community cannot reach a consensus on whether the country uses the exception to promote the military use of nuclear material through enriched uranium (HEU). Despite the unsafe periods of its life cycle, nuclear material from the reactor diverges from nuclear weapons. Brazil is the only country to develop nuclear technology in submarines other than one of the five permanent members of the United Nations Security Council (China, France, Russia, United Kingdom, and the United States), or non-permanent members but with a nuclear weapon (India).

This article will first survey the two main factors under the auspices of a new democratic Brazil in the '90s: first, the defence strategy on the Global South began to change once the region gained economic influence with transnational exportation of commodities. Economic growth changed the deteriorating condition of Brazil's warships and other equipment, the feeble capacity of the country's fleet, and the inadequate lack of funding for training and exercises (Martins

Filho, 2011: 277). Brazil's interest in taking part as a permanent member of the UN Security Council and the demonstration of power by its nuclear submarines seem to be the main political-strategic gain in investing public resources by a country with so many social needs.

The vast extent of the Brazilian sea urges the State to adopt a more active position regarding the possible strategic vulnerabilities and threats of hostile naval forces. The United Nations Convention on the Law of the Sea establishes several provisions on submarines transit and the legal status concerning innocent and free passage through alien territory. First, the Convention highlights that all submarines shall navigate the surface and display their flag while in the territorial sea. Second, even if a submarine navigates the surface and displays its flag in the territorial sea of a coastal state, it cannot enjoy innocent passage when engaging in any act aimed at collecting information to the detriment of the defence or security of the coastal State. However, Nuclear-powered submarines may be obliged to limit their passage to sea lanes under art. 22 (2) and when exercising the right of innocent passage. Also, the article requires carrying documents and observe special precautionary measures established for such ships by international agreements (Rothwell, 2009: 4). As to the emergencies, nuclear-powered ships have the same rights as conventional ships, and this holds especially true for all international law applicable.

Thus, this paper aims to address Brazil's nuclear submarines' technology destined for its national defence of an area rich in natural and mineral resources called the Blue Amazon, and the impact of this maritime turning point to Brazil's defence police. Any considerations on the Brazil's right to promote the use of nuclear fuel in submarines developed under the International Agreements ratified by the country, in particular, the NPT, the Treaty on the Prohibition of Nuclear Weapon (TPNW)[2] and the 1967 Treaty for the Prohibition of the Use of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco).

It is argued that international security must come first following the IAEA, although its questionable authority on privileges to the North. Also, the rules adopted by the NPT and the regional treaties concerning the use of nuclear material for propulsion in the South Atlantic emergence 'Blue Economy' are regarded as the cornerstone of a new orientation, and it explains how the project's design can be in consonance with international rules, no falling in the hands of the additional protocol on safeguards.

[2] However, the TPNW never entered into force, and Brazil is not a State party, having it only signed in 2017, without ratifying it.

Third, the new Brazilian defence agenda facing a new apex of an autonomous Global South region is highlighted, and how this initiative is changing America's regional hegemony status as the sole global maritime power in the region.

2. The nuclear-powered submarines: any role of international law?

The possession of a nuclear submarine constitutes an old ambition of the Brazilian Navy. Nuclear-powered ships are equipped with a nuclear power plant categorically distinguished from ships carrying nuclear weapons or nuclear materials. A differentiation between USVs (Unmanned Surface Vehicles) and UUVs (Unmanned Underwater Vehicles) is also essential to develop a further concept of innocent passage of submarines. On the assumption that submarines and other underwater vehicles constitute ships, only UMVs (Unscrewed Maritime Vehicles) intended for marine scientific research will be regarded as scientific research vessels under Part XIII of UNCLOS. Another distinction applies to the nuclear-powered submarines if considered as warships under Art. 29 of UNCLOS.

> A ship belonging to the armed forces of a State bearing the external marks distinguishing such ships of its nationality, under the command of an officer duly commissioned by the government of the State and whose name appears in the appropriate service list or its equivalent, and manned by a crew is under regular armed forces discipline.

In straits used for international navigation between one part of the high seas or an EEZ and another part of the high seas or an EEZ, all vessels shall enjoy the right of transit passage and it does not require submarines to navigate above the surface and display their flag (UNCLOS, 1982, Art. 38). All rules concerning the freedom of navigation apply to nuclear-powered ships as the world waits for a further development of special rules applicable to nuclear-powered ships, especially the potential risks involved in nuclear navigation, such as unreasonable radiation level or other nuclear hazards and the release of radioactive substances. Nations are intent to perform bilateral agreements concerning nuclear navigation and authorization for special operations (Boulanger, 1972: 5).

Brazil has a historically peaceful attitude concerning the non-proliferation of the use of nuclear weapons, being a reference to a free zone in favour of the maintenance of international peace and security (Erthal, 2016: 1). Brazil is part of the Community of Latin American and Caribbean States (CELAC), and its declarations on nuclear disarmament in 2013 stress the importance of

being part of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco). The Treaty establishes a nuclear-weapon-free zone in 1967. The work done by the Member States of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) is an international benchmark in creating zones free of nuclear weapons and is the only international intergovernmental organization specialized in non-proliferation and nuclear disarmament.

Brazil as a member of the United Nations is aware of the main resolutions adopted by the organization on the acceptable balance of responsibilities and mutual obligations between nuclear and non-nuclear powers, recalling the denuclearization agreement of Latin America and considering the principles of the UN Charter and regional agreements. The first section of the article analyses the international agreements adopted by Brazil on the governance of nuclear material for propulsion.

Tlatelolco Treaty prohibits the testing, use, production, acquisition, stockpiling, installation, possession or control of any nuclear weapon by the parties to the Treaty in their territories (Art. 1(2)). The Treaty of Tlatelolco's definition of "nuclear weapon" is any device capable of releasing nuclear energy hasty and which has a group of characteristics appropriate for use for warlike purposes. Brazil ratified the Agreement, and the Comprehensive Nuclear Test Ban Treaty. Since 1991, Brazil's nuclear program is subject to the rules of the IAEA and the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC). The Agreement was the first in the world to promote bilateral cooperation on the application of mutual nuclear safeguards in the world and the creation of the first bilateral nuclear agency to present a peaceful nuclear oversight.

The Nuclear Non-Proliferation Treaty of 1968 is at the center of the nuclear non-proliferation system. The Treaty reinforces the objectives of the 1963 Agreement, which prohibits the use of nuclear weapons tests in the atmosphere, in space and below the water column, including the desire to put an end to human contamination of the environment by active radioactive substances. The Treaty does not intend to prohibit nuclear weapons altogether. Yet, it attempts to limit the spread of nuclear weapons in the arts. I and II. It sets the peaceful use of nuclear technology in arts. III-V and entrusts overseeing compliance with a safeguard system to the IAEA.

The NPT is at the heart of the most robust weapons of mass destruction (WMD) non-proliferation regime that led to the signature of the Comprehensive Test Ban Treaty (CTBT) in

1996 by offering a last political push during the 1995 Review Conference.[3] The Treaty suffered a structural review in 2005, and members of the Non-Aligned Movement complained about the Treaty's lack of universality and reciprocity based on its refusal of nuclear power to join. India, Pakistan, and Israel are *de facto* examples of nuclear nations not participants of the NPT. However, they stress their international commitment to cooperate through regional or bilateral agreements with other nuclear powers, such as the 2006 US-India Civilian Nuclear Cooperation Agreement.

The lack of universality, different treaties' responsibilities between nuclear-weapon States, and emerging nuclear powers not parties to the Treaty raise doubts about the legitimacy of the whole Treaty regime. The lack of compliance also strikes its credibility as States may develop the research, production, and use of nuclear energy for peaceful purposes, enshrined in art. 4, closely linked with the withdrawal policy adopted by the Treaty's regime, of which the two well-known cases being Iran and North Korea (Krause, 2006: 7). The Treaty is responsible for a comprehensive set of safeguards standards, adopted with the State's consensus, as they conclude the safeguards individually, according to the 1972 Comprehensive Safeguard Agreement. It entitles the Agency to ensure that all sources and special fissionable material in all peaceful nuclear activities of a State are subject to safeguards. However, the system is still under verification, as many State parties not yet ratified safeguards agreement, and only about half of the State parties to the Non-Proliferation Treaty concluded safeguards agreements in line with the 1997 Safeguard Model System with the IAEA.

Settling an Additional Protocol to the Treaty was a reaction to the discovery of hidden nuclear weapons programs in Iraq and North Korea in the '90s and grants the IAEA full access to nuclear information and facilities in the signatory countries. It also allows the IAEA to gain a fuller view of nuclear programs, plans, nuclear material stocks and trade in these States, the Additional Protocol enhances the IAEA's ability to provide a much higher guarantee of the absence of undeclared nuclear material and activities States (IAEA, 1997).

In the Chairman's Working Papers of Preparatory Committees for the 2010 NPT Review Conference, a CSA coupled with an additional protocol, referred to the NPT's verification standard, also recorded that concluding an additional protocol should remain 'a voluntary confidence-building measure' (NPT, 2008, para. 30). NPT States Parties hold the view that they are not legally obliged to conclude an additional protocol. It could be argued that since it holds an optional character, NPT Stater cannot continue to be bound automatically by documents that are produced by a body whose

[3] The Treaty is composed of three pillars: non-proliferation, disarmament, and the civil use of nuclear technology. The Treaty's universalization of the NPT and the enhancement of non-proliferation tools, such as the IAEA Additional Protocol are also quoted as weak critical points of the Treaty. It holds a poor record of its regime in terms of concrete benefits it yielded over the years.

membership is not identical with them, e.g., IAEA's Board of Governors that are not NPT parties (India, Pakistan and Israel).

The Additional Protocol is a legal document that grants the IAEA inspection authority for the underlying safeguards agreements. It applies to all three types of safeguards agreements, and by its 'complementary access' system, the IAEA would have the right to collect environmental samples at locations beyond declaration if it deems it necessary to do so (ASADA, 2011: 4). The NPT obliges State members to subject their peaceful nuclear projects and activities to IAEA safeguards under Art. 3.1. Initially, the provision intended to detect and deter the diversion of nuclear material, a concept further developed in the 2010 Review Conference, designed for the verification of the correctness and completeness of State declarations to assist with the credible assurance of non-diversion of nuclear material (IAEA, 2010, para. 13).

There is no reference to specific types of 'safeguards', such as the Comprehensive Safeguards Agreement (CSA). However, the measures contained in an additional protocol based on the Model Additional Protocol also cover all nuclear material in all peaceful nuclear activities of a State (ASADA, 2011: 6). The Protocol addresses to States that have any safeguards agreement with the IAEA, and those who conclude additional protocols must accept all provisions of the Additional Protocol of the Model, approved by the Board of Governors in 1997. If a conflict arises between the Safeguards Agreement provisions and the Protocol, this Protocol shall apply (IAEA, 1997). The Plan of Action distinguishes IAEA Member States with substantial nuclear activities (Group 1) and the IAEA Member States with limited nuclear material and activities (Group 2). The Secretariat highlighted critical factors that influence States' consideration of the conclusion of safeguards agreements, stressing that some member States with limited nuclear material and activities considered a low priority given to nuclear non-proliferation and insufficient knowledge of legal requirements and the role of strengthened safeguards (IAEA, Doc. INFCIRC/153).

Initially, Brazil and Argentina adhered neither to the Treaty itself nor to the Additional Protocol. The two countries instituted a bilateral safeguard agreement (the Quadripartite Treaty) in 1991, and in 1994 it entered a comprehensive safeguards agreement with the IAEA. Only after establishing this regional system, recognized by the IAEA and of which it is an active part, the countries agree to the NPT (Argentina in 1998, Brazil in 1999). The regional safeguard project carried out by the two countries is an international reference. However, should one of the two countries join the PA individually, it would have to denounce the Quadripartite Treaty, the associated INFCIRC-435, and sign a new proper comprehensive safeguards agreement with the IAEA to agree to the Additional Protocol. The Quadripartite Agreement is more prescriptive in terms of what may cover in the arrangement in subparagraph C, as it limits the arrangement

"only to such matters as temporal and procedural provisions and reporting arrangements" whereas INFCIRC/153 adds the word "etc." following that phrase.

Brazilian natural maritime vocation is backed by its extensive coastline and by the strategic importance represented by the South Atlantic (Brazil, 2005). Yet, the region aspires to be a nuclear-weapons-free zone, self-governing through peaceful solutions with a clear slogan of favourable antinuclear policy but craves for exclusive South Atlantic power and the monopoly of maritime spaces. Perhaps these remain ambitions, represented by Brazil's lack of material means to single-handedly alter the region's security context, followed by an unmatched discourse that the country promoted considering its actual capacity (Daalder, 2006: 105). This section seeks to identify the need for an ongoing research effort to overcome the limitations of data, and how Brazilian policy is necessary to persuade, in terms of a national strategy, that the Navy will combat, and thus deter hostile acts.

3. The Brazilian Nuclear Program: self-sufficiency facing the nuclear firewall

Brazil never had a nuclear-weapon program to dismantle in the first place, both investment and ambition in the field over time have grown rather than shrunk. The Brazilian case has many nuances that cannot consider, for instance, a nuclear rollback (Sagan, 1996: 54-86). Countries may evaluate the nuclear reversal category, following the criteria of nuclear policy decisions by political leaders and the impact of domestic regime types on nuclear policy. The 1988 democratic constitution banned non-peaceful uses of nuclear energy, which did not prevent the country's gradual acquisition of more sophisticated and complex nuclear technology systems.

The Marine Nuclear Program (PNM) has been running since 1979 to master the nuclear fuel cycle, develop, and build a nuclear power generation plant. Such expansion of Brazilian's intentions, joined by international commitments with the ABACC and the NPT, coincided with greater transparency and acceptance of important non-proliferation controls (Solingen, 1994: 126–69).

In 2008, Brazil started the Submarine Development Program (PROSUB), with an initial cost of 21 billion reals, and the construction of a shipyard and a naval base in the city of Itaguaí, in Rio

de Janeiro.[4] The Brazilian government delivered the first submarine of the series, and they schedule the second S 41 to operate by 2023.[5] For over thirty years, the Brazilian Navy demanded a nuclear submarine, because they consider its inconceivability to be the most capable mean of naval deterrence. The control of a nuclear submarine waste is the responsibility of the National Nuclear Energy Commission (CNEN), associated with the Ministry of Science, Technology, Innovation, and Communications (MCTIC) to develop the national nuclear energy policy. CNEN establishes rules and regulations in radioprotection and regulates, licensing, and supervising the production and use of nuclear energy in Brazil.

Amongst these regulations, the CNEN-NE-6.05 (Management of Radioactive Waste in Radioactive Facilities) defines as radioactive waste any material resulting from human activities, containing radionuclides in amounts exceeding the limits established by the CNEN-NE-6.02 (Licensing of Radioactive Installations), whose reuse is improper or not foreseen. The intermediate and final disposal of these wastes is the responsibility of CNEN. The irradiated fuel elements are in an appropriate pool, with the capacity to save enough for the entire operational period of the plant (CNEN, 2019).

Despite the consensual incipient characteristic of Brazil's nuclear program, the revival of nuclear technology usage in national nuclear submarines constitutes an important indicator of how Brazil intends to reshape its influence in the region, projecting its leadership and present itself as an alternative hegemonic leader in the South Atlantic. It does not rule the conventional submarines out by the government in coastal areas and limited patrol areas, while nuclear submarines are for the defence of more distant maritime frontiers, because of their greater mobility and longer submersion time. However, the nuclear-powered submarines have greater autonomy, since there is no need to emerge periodically to replenish oxygen, while at the same time, nuclear-powered submarines are able to reach higher speed.

The NPT brings the exception to safeguard in the Brazilian project, where nuclear material is for nuclear fuel, and even if there is no official agreement based on the Additional Protocol Model (INFCIRC/540), the Brazilian State guarantees that enriched uranium will not dodge from its previous purpose (Egel, 2015: 239-251). The Agreement provides for special safeguard procedures only as long as nuclear material is for nuclear propulsion or in the operation of any vehicle, including submarines and prototypes, or another non-prescribed nuclear activity as agreed between the State Party and the Agency. Both the Final Document of the 2000 NPT Review Conference in May 2000 (NPT/CONF.2000/28), and the Final Document of the 2010

4 The project includes the construction of four diesel-electric propulsion submarines: Riachuelo (S40), the first of the new class, Humaitá (S41), Tonelereno (S42) and Angostura (S43).

5 It has 2,100 tons, capable of firing torpedoes and, shortly, missiles of at least two destinations, of the cruise, with reach in the 300 km range, and anti-ship, in the limit of 180 km to 200 km.

Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT/CONF.2010/50) encouraged the IAEA to further facilitate and assist the States Parties in the conclusion and entry into force of comprehensive safeguards agreements and additional protocols.

On 18 July 1991, the Agreement on the Pacific Use of Nuclear Energy between Brazil and Argentina marked the apex of the process of cooperation and integration in the nuclear area between the two countries. Through art. 1 of the Agreement, the Parties undertook the pacific use of nuclear facilities and materials under their control or jurisdiction under. The Agreement also considers the right to use nuclear energy to develop any vehicle that uses it as a means of propulsion, including submarines, as peaceful uses of atomic energy (art. 3): 'Nothing in this Agreement shall limit the Parties' right to use nuclear energy for the propulsion or operation of any vehicle, including submarines, as both are peaceful applications of nuclear power'.

The Common Nuclear Material Accounting and Control System (SCCC), under Article IV, shall apply to all nuclear material of any nuclear activity carried out in the territory of the Parties, as well as to materials or activities under the jurisdiction or control of one State. It is worth mentioning that Argentine nuclear inspectors are to supervise the Brazilian facilities and vice-versa, which presupposes high cooperation and confidence in pursuing the goal of both countries to use nuclear energy peacefully. This model of reciprocal control provided by ABACC resolves distrust between rival neighbours, such as the tension between India and Pakistan or between Israel and Iran. IAEA seeks to reduce high safeguard costs, which is why it seeks partnerships (Santos, 2015). Under art. 13(a) of the ABACC Agreement, Brazil must inform the IAEA of the peaceful use of nuclear material, while 13(b) provides for the need to create an "arrangement" whereby "special safeguards" procedures shall apply to nuclear material intended for the nuclear-propelled submarine.

In the safeguards' agreement between Brazil and the IAEA, there is a legal possibility for Brazil, with the approval of the Agency's Board of Governors, to remove safeguards nuclear materials to be in non-prescribed military activities such as naval nuclear propulsion. As the possibility limits the power of the Agency to verify that no nuclear material is diverted to pursue the development of nuclear weapons or other nuclear explosive devices, the terms of the withdrawal from safeguards are likely to generate a period of hard-nosed negotiations between Brazil and the IAEA, and between Brazil and Argentina.

At this stage, it is not clear whether Brazil will conduct such negotiations under a quadripartite framework involving Argentina, Brazil, the IAEA, and ABACC. Perhaps, the fulcrum of tension will be the likely conflict of norms between INFCIRC/153 and the Quadripartite Agreement. Paragraph 14 of INFCIRC/153 contemplates the possibility of the non-application of

safeguards to nuclear material in non-peaceful activities, and NFCIRC/435 commits Brazil "to accept safeguards on all nuclear material in all nuclear activities," differing from the general commitment expressed in INFCIRC/153. Article 13 of INFCIRC/435 does not refer to "non-application of safeguards to nuclear material in non-peaceful activities," but to "special procedures," which must apply if the State intends to use nuclear material, and safeguarded under this Agreement for nuclear propulsion or operation of any vehicle.

The Quadripartite Agreement establishes that these special procedures shall apply its uses only to the nuclear material for nuclear propulsion or in the operation of any vehicle, including submarines and prototypes, or such other non-prescribed nuclear activity.

Brazil holds a position of not adhering to the Additional Protocol, which raises the debate on the additional demands made by Nuclear Weapons-Free Zones countries (NWS) and the continuously developing an environment of nuclear control until the Institution makes progress, based on the obligations under art. 4. For instance, the Agency applies the formal review mechanism required process under the Art. VIII.3 of the Convention to supervise the fulfilment of the obligations of the Treaty by its members. States Parties absent from the Review Conference in which a new interpretation of the term 'safeguards' is agreed upon, may argue that they cannot accept the new interpretation as an authentic interpretation of the Treaty. Therefore, if consensus is not attainable, the NPT Review Conferences can, by a two-thirds majority, adopt a new interpretation of Article III, paragraph 1, or the final documents containing it (NPT/CONF.2010/1).[6]

The Brazilian jurisdictional waters is an immense region, about 3.5 million km², and Brazil's request for an extension of the Brazilian continental shelf, based on the work carried out by Plano de Levantamento da Plataforma Continental Brasileira (LEPLAC), the Brazilian Continental Shelf Survey Project. I estimate the number to reach around 4.5 million km², this addition corresponds to about 11% of the national territory. UNCLOS normative unification of maritime spaces brought greater consensus to countries in their development processes facing an increasingly global economy.[7] The continental shelf comprises submerged areas next to the territorial sea zone and comprises the bed and subsoil of undersea areas extending beyond its territorial sea, throughout the natural extension of its land territory, to the outer edge of the continental margin, or up to 200 nautical miles from the baseline from which it measures the breadth of the territorial sea, where the outer edge of the continental margin does not reach that distance.

6 Rule 28 of the Rules of Procedure.

7 The UNCLOS entered into force internationally on November 16, 1994. Decree no. 1,530, dated June 22, 1995, declares the entry into force for Brazil on that same date.

4. Reflections about the military presence in the South Atlantic: Brazil's nuclear project in the spotlight?

The hegemonic concentration of real capabilities by the USA discouraged any great gains of power since the beginning of the twentieth century and there is very limited scope for offensive military operations among American states in pursuit of security and self-interests (Duarte, 2015: 5). The role of submarines during war times and peace has become a vital source of State's defence, and its regulation under international law seeks to accommodate rules of the law of the sea, the law of neutrality, and the law of conduct in a military operation.

It is not unlawful to cause incidental injury to civilians, or collateral damage to civilian objects, during an attack upon a legitimate military aim (Roach, 2017: 6). However, general in charge must take all reasonable precautions, as humanitarian considerations to keep civilian casualties. All the fundamental principles of the law of armed conflict apply to submarine warfare and basic rules of maritime neutrality. The law permits attacks only on objectives of military importance but permits the use of sufficient mass to destroy those objectives.[8]

There are several limitations in trying to adequate modern international law and law of naval warfare to nuclear submarines, turning researchers to non-treaty sources and hardening the sources of information in the public domain concerning submarine operations. Therefore, if Brazil's domestic interest in using nuclear submarines in a conflict in the South Atlantic shall fulfil the international law of naval warfare considering the acceptable practice of States in a war at sea, despite its questionable development and improvement since the Geneva Protocol. With a nationalist government rising to power from 2008 to 2010, there was an insertion of academics in the discussion of national defence (Moura, 2014: 7). Most of the sections of the Indian-Pacific maritime trade routes in the Southern Hemisphere are under Brazilian responsibility for salvage and rescue.[9] The international projection of Brazil's leading to more excellent monitoring and

[8] The Treaty made no distinction, in general, between submarines and surface warships concerning attacks upon enemy merchant shipping. However, in case of persistent refusal to stop when ordered to do so, or in the event of active resistance to capture, a warship 'whether the surface vessel or submarine' may not destroy an enemy merchant vessel without having first placed passengers, crew and ship's papers in a place of safety' (Article 22) The submarine may employ its conventional weapons systems to attack enemy surface, subsurface, or airborne targets wherever located beyond neutral territory.

[9] Denominated "SAR area," five powers with military capacity in the South Atlantic can be identified. Two with permanent position: USA and China, and three with a relatively limited role in the region: Brazil, United Kingdom (with five islands/archipelagos) and France (in French Guiana).

control of spaces, strategic mobility and the presence at sea, implies that it endows the Brazilian Navy with an undersea force composed of conventional and nuclear submarines.

NATO has indicated the need for Brazil to have a more significant presence in the South Atlantic, and the increased presence of Chinese naval bases on the African coast, besides creating an alternative to the Panama Canal, reveals China's interest in the South Atlantic (Aguilar, 2013: 47-48). United States's regional hegemony has praised Brazil's development and preponderance as a sub-regional outstanding position. The country's overall concern remained as Brazil searched for partnerships outside its defensive area, way beyond the North Atlantic, including regions of peace, democracy, social inclusion and which do not admit in its territory arms of mass destruction (Brazil, 2019). Yet, Brazilian low perspective of threat reflects the relatively lower investments on its security concerning any other South America State (Proença, 2008: 311-320). The notion of a defence organization in the South Atlantic emerged in 1986 in the form of ZOPACAS aimed to establish the South Atlantic as a demilitarized space free of foreign military bases, and weapons of mass destruction. Yet, a decade-long of hibernation deepened the feeling that this institution could not serve its purpose of devising a multilateral guarantor of a peaceful region. The noticed retraction is due to an acute lack of logistical capacity, combined with the non-binding nature of ZOPACAS' declarations, irregular calendar of activities, and the emergence of new regionalisms on both sides of the South Atlantic.

The Institution surfaced again in the late '00s, willing to tackle a central role in nuclear non-proliferation and regional security, topics that kept their centrality within the ZOPACAS agenda. Brazil did not assume the Institution's presidency, however, stressed the Country's South Atlantic interest, given that: 'the more we cooperate, the less space we will leave for undue foreign interference' (Brazil, 2019).

NATO's North Atlantic Treaty, signed in 1949, reaffirms the State's rights of independent states to individual or collective defence disposed of in the United Nations Charter art. 51 to Europe and America. Yet, NATO can and will act south of the Tropic of Cancer when, and where deemed necessary, its driven actions are not only by the logic of non-proliferation but also the future developments of the strategic environment of the Alliance. On the one hand, Brazil presents itself as a provider of naval expertise and an important role in designing and planning in regional cooperation. The country suffers severe conceptual maritime challenges, for example there are many inconsistencies in the Brazilian policy-making, reflected in the National Strategy of Defense (NSD) of 2008 and its previous defence frameworks. First, the NSD lacks comments on cooperation between all platforms available with the land and air forces, on guided (cruise) missiles capabilities (Flores, 2011: 5–11). The project highlights as a priority of defense research the nuclear development, yet there is no real fleet expansion program other than the acquisition

of oceanic patrol vessels, and an effective joint operational structure, including expertise and command systems.

The Brazilian project emerges in an international context of disarmament, regarded as the key to the rebalancing of nuclear treaties that previously found no progress in other areas, such as verification. They need engagement to ensure that they set the measures and instruments for compliance and verification in place. Brazil's bet on the nuclear renaissance over the last couple of years, growing the technological interests in the civilian use of nuclear technology (Mölling, 2010: 5). Yet, a big fault in Brazil's security reforms is the dearth of defence analysts, especially on maritime issues (Duarte, 2015: 32).

The limited capacity of ZOPACAS underpins NATO members' military presence in the region, continuing to act as an 'external solution' for regional security against issues as drug-trafficking (Abdenur, 2015). The Institution merges a stance against the presence of nuclear powers in the area, NATO member overseas control motivates cooperation south-to-south, e.g., British Overseas Territories and Norway's Bouvet Island, despite the international treaties that prohibit nuclear weapons (Poggio Teixeira, 2019: 99). Therefore, one would suggest that the country seems to hold on the perception of an imminent technological turn that will permit exploration of the pre-salt oil on a commercial scale, and the assumption that this exploration will generate substantial revenues for the Brazilian government.

5. Conclusion

Brazil takes an essential step towards a non-nuclear-weapon State that promotes knowledge and promotes it peacefully by developing nuclear technology in submarines, according to parameters established by the responsible international bodies. The insertion of new actors in the international scene with nuclear power concerns, to a certain extent, accustomed to nuclear polarization for decades, and later the partial opening to the permanent states of the UN Security Council. The opening of Brazil to the promotion of those technologies brings a new global configuration necessary for the modern times and challenges of maritime defence, especially after the discovery of vast oil reserves in the pre-salt region. In a world under close surveillance of opposing forces, notably through satellite imagery, undetected submarines, especially when capable of submerging themselves deeper, can afford weaker states' considerable deterrent capability.

First, the set of arguments for the construction of the South as a strategic area gained particular adherence over the last couple of years justified for the need for nuclear technology investments

through the framing of domains of insecurity regarding the South Atlantic strategic area. Conversely, most countries of the region have the barest of capabilities to secure its coastline, within 12 nautical miles and across their 200-mile EEZ, lacking resources and poorly founding coast guards and navies compared to major marine power fleets on North Atlantic sea. In this manner, the project arguments in favour of security and development by the Brazilian elites directly involved in the project, based on the politics of insecurity, support the arsenal with conventional torpedoes, thus increasing Brazil's conventional deterrent capability.

The escalation of national measures and international cooperation strengthens the nuclear safety bases of the Brazilian nuclear project. The international commitments pursued by Brazil are key elements to its national policies: the submarine project shall undertake specific procedures adopted by Article 13 of the Quadripartite Agreement, all nuclear material, and nuclear activities shall be under safeguards, not included under the agreement. However, the Brazilian decision not to approach either in connection to its submarine program does not grant consent to Brazil unilaterally declare any such material or activities are automatically beyond the reach of the IAEA. There is no automatic exclusion of nuclear material under their use or intended used to support the military activity. The non-subordination to the 'invasive' parameters of the Additional Protocol to the IAEA Treaty shows the dissatisfaction among countries considered the extras in the arms race despite their self-government condition in developing projects, e.g., Brazil, in the words of the responsible authorities. A strategic position taken, the only certainty that remains of this saga is that a new world configuration is building itself before the attentive eyes of those who fear, and aim for, the total control of nuclear weapons. It treats the Brazilian case with the severity necessary of the IAEA so it will not become a precedent for other countries in the same situation. The hegemony of the United States in the nuclear scene and its strong influence on the IAEA make the debate exceed the legal dictates imposed on it, and whose vagueness transfers to imposed political negotiation into procedures.

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