FROM SLAVERY TRADE TO THE INTERNET: SOUTH-ATLANTIC ROUTES, TERRITORIAL INTEGRATION AND THE NASCENT GEOGRAPHY OF SUBMARINE CABLES BETWEEN BRAZIL AND THE AFRICAN CONTINENT

DO TRÁFICO DE ESCRAVOS À INTERNET: ROTAS SUL-ATLÂNTICAS, INTEGRAÇÃO TERRITORIAL E A NASCENTE GEOGRAFIA DOS CABOS SUBMARINOS ENTRE O BRASIL E O CONTINENTE AFRICANO

DEL TRÁFICO DE ESCLAVOS A LA INTERNET: RUTAS SUR-ATLÁNTICAS, INTEGRACIÓN TERRITORIAL Y LA NACIENTE GEOGRAFÍA DE LOS CABLES SUBMARINOS ENTRE EL BRASIL Y EL CONTINENTE AFRICANO

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Abstract

Currently, almost the entire totality of global Internet traffic passes through optic fiber submarine cables. The profusion of these cables throughout the oceans includes the South Atlantic, where there are four installed or designed cables connecting Brazil directly to Africa. The selected routes suggest the geographic continuity of a long historical process of territorial integration that has started violently in the 16th century with the Atlantic slavery trade. Likewise, a few private entrepreneurs supported by National States have always been the main agents of an integration that, despite its violent beginning, is now part of the so-called South-South Cooperation process.
Keywords: Submarine cables, territorial integration, Brazil-Africa, South Atlantic.

Resumo

Pelos cabos submarinos de fibra ótica passa, hoje, a quase totalidade do tráfego de internet em escala mundial. A profusão destes cabos pelos principais oceanos passa também pelo Atlântico Sul, onde atualmente estão instalados, ou em projeto, 4 cabos conectando diretamente o Brasil à África. Uma análise das rotas selecionadas sugere, porém, a continuidade geográfica de um longo processo histórico de integração territorial que se iniciou de maneira violenta com o tráfico de escravos ainda no século XVI. Da mesma maneira, foram sempre alguns poucos agentes privados, apoiados por Estados-nacionais, os principais operadores desta integração, que apesar de inicialmente violenta hoje se insere no assim denominado processo de Cooperação Sul-Sul.
Palavras-chave: Cabos submarinos, integração territorial, Brasil-África, Atlântico Sul.

Resumen

Por los cables submarinos pasa hoy la casi totalidad del tráfico web global. La profusión de estos cables por los océanos incluye el Atlántico Sur, donde actualmente están instalados o en proyecto 4 cables que conectan directamente Brasil y África. Sin embargo, un análisis de las rutas seleccionadas sugiere la continuidad geográfica de un largo proceso histórico de integración territorial, que comenzó violentamente con el tráfico de esclavos en el siglo XVI. También, algunos pocos agentes privados apoyados por los Estados nacionales fueran históricamente los principales operadores de dicha integración, que a pesar de su origen violento hoy se denomina Cooperación Sur-Sur.
Palabras-clave: cables submarinos, integración territorial, Brasil-África, Atlántico Sur.

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Introduction[1]

It is a consensus that the first contacts between the Brazilian socio-spatial formation (Santos, 1977) and their African counterparts date from the sixteenth century, with the beginning of a process known as the "Atlantic slave trade" (Almeida, 2017, p. 447) which used marine transportation as its main driver. Four centuries later, it was only after World War I that, for the first time, it was possible to cross the Atlantic Ocean by means other than maritime navigation, and with the advent of air transport a structure of territorial integration was established between the Brazil and African States fundamentally based on ports, airports, sea routes and air routes.

But a new form of integration between these territories is now a reality, now related not only to the issue of circulation but also to communication between them. Since the beginning of the 2000s, large telecommunications companies have been organizing Internet infrastructures (such as submarine cables and data centers) linking Brazil with Angola, South Africa, Cape Verde, Cameroon, and Senegal, having the city of Fortaleza, in Ceará, as a hub point of connection and informational integration between the Brazilian territory and the African continent[2].

Critical infrastructures for the operation of the economy on a global scale (Davenport, 2012), fiber-optic submarine cables transport essential information that ensures, in real time, billion dollar financial operations, productive operations that can coordinate dozens of production sites in different countries, high-tech scientific research, and key elements of national security. This importance of information in the international economy corroborates Santos' view (1994, p. 17), recognizing it as "the true instrument of union" of territories in the contemporary world, so that the territorial integration between Brazil and the African states necessarily involves an informational integration based on the Internet and its submarine fiber optic cables.

The internet and geographic space: the geography of submarine cables

> Unlike its ostentatious fluency, the geography of the Internet reflects the geography of the Earth; refers to the borders of nations and to the shores of continents. (Blum, 2012, p. 36).

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Widely disputed in Geography, the idea that the interconnectivity on a world scale made possible by the advent of the Internet would diminish, or even suppress, the importance of geographical space, left as an important theoretical contribution the concept of "cyberspace". Discussed with different degrees of criticism by authors such as Malecki (2001) and Motta (2012), there is a consensus in understanding cyberspace as the virtual (and even immaterial) component of the internet, so that even invoking a spatial dimension in its denomination, the physical infrastructures and the political-economic relations necessary for this global circulation of information are not considered. However, rescuing the concept of "geographic space" defined by Santos (1996, p. 63) as an "indivisible set […] of systems of objects and systems of actions", such dimensions seem fundamental to understand the so-called Geography of Internet.

Thinking of it first as a system of objects, one can define the internet as a network of physical transmission of data between different points in geographical space. Broadly speaking, these transmitted data are nothing more than information transformed into binary language[3] and grouped in so-called "data packets", which travel from one point to another of the geographical space by various physical conductors according to the adopted technology. As discussed in Warf (2006), this exchange of data on a global scale is made possible today by two complementary and competing technical systems: satellites and submarine fiber optic cables.

Taking a historical trajectory from this international data transmission, the US geographer points to a predominance of satellites until the mid-1980s, suggesting a link between its decay (and the consequent proliferation of private companies in the fiber optic sector) with the emergence of the neoliberal paradigm and the concomitant emergence of the internet as the fundamental variable of the world economic system. The technical details of both technologies are quite complex and can be better understood in Tanenbaum (2003), but with the development of technologies such as new oceanic signal repeaters and the so-called DWDM[4], the data transmission capacity of fiber optic cables has made it almost impossible to compete on the part of satellites, causing today about 95% of the data packets on the global scale to travel by submarine cables (Clark, 2016).

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Fiber optic submarine cables are, however, only one of the technical objects necessary for the operation of the Internet, thus connecting to a set of other types of cables and geographical fixes in a systemic way. At the landing points of these submarine cables[5], there is usually a station where the cable connects to other cables and to other larger stations with hundreds or thousands of routers, conventionally called Internet Exchange Points (IXPs). Fundamental in the emergence and expansion of the Internet in the USA (Blum, 2012), these geographic fixes function as "bus stations" where cables provide and redirect data packets through other cables, which in turn have different configurations and functions, evidencing still more the systemic constitution of objects of the Internet.

Between the landing point located on the coast and a large IXP, the data passes through a connection cable called the backhaul (Malecki; Wei, 2009), and it is through this system that the submarine cable connects to the backbone of the internet of a national territory (Motta, 2012). In large metropolises, in addition to these types of cables mentioned, there are also generally ring-shaped metropolitan networks that surround the entire urban spot to provide redundancy and ensure connectivity to a large number of users.

Simultaneously with a system of objects, the internet is also, as part of the geographic space defined by Santos (1996), a set of systems of action. This implies, therefore, a set of agents and a political-normative system that allow these technical objects to perform their functions. In the case of submarine fiber optic cables, the agents involved are historically large international corporations that are articulated in the manufacture, research, installation, and operation of the cables, and that often are involved in conflicts and negotiations with the national States through which these cables pass or land.

According to Davenport (2012) and Van Logchem (2014), the mediation of these conflicts and the international regulatory system affecting all stages of submarine cable operation are provided for in the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which basically divides and defines maritime areas across the globe in three major types: (1) territorial sea; (2) the continental shelf and the exclusive economic zones (EEZs); and (3) the high seas. Based on the legal principles of "due regard" and the "freedom" of cable installation, the convention makes a kind of gradation of the level of regulation to which States may

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subject the private operation of submarine cables, from greater sovereignty in the territorial sea[6] to an almost total freedom on the high seas, passing through the more ambiguous region of continental shelves[7] and EEZs, where state sovereignty and corporate freedom are constantly in conflict.

In order to assert these devices found in UNCLOS, regulatory instruments such as permits and notifications stand out (Van Logchem, 2014), claimed by states or corporations according to their interests. Generally triggered in disputes on continental shelves and EEZs (but also in territorial sea), Permits are documents that States require for corporations to operate in maritime areas where their sovereignty is in force, while they advocate the use of simple notifications without having to submit to the approval or disapproval of States. Another way to deal with these conflicts is the "submarine cable corridors", inspired by the traditional transport corridors and designed around the cable routes, functioning as official protection zones of these already existent in some East Asian countries (Davenport, 2012).

All this set of systems of objects and systems of actions of the internet have in this relation between the public and the private its essential conflict, widely debated by diverse authors. In short, the discussions are divided between those clamoring for less obstacles and greater agility in the operation of submarine cables, suggesting less regulation despite the more pondered discourse (Davenport, 2012; Van Logchem, 2014), and to those, especially Americans, demanding a greater intervention and control on the cables by the States, arguing questions of sovereignty and national security (Sechrist, 2010; Clark, 2016). In any case, because they own all the physical infrastructure, large private consortia are the main operating agents of submarine fiber optic cables, putting the discussion more in terms of corporate governance (Dowbor, 2017) than of a hybrid regulation of the territory (Antas Junior, 2005), where states and corporations would share such a task.

The case of submarine fiber-optic cables between Brazil and the African continent does not escape the rule, and it is primarily private consortia (with greater or lesser connection to their home states) responsible for the design and operation of these cables in recent years. Thinking historically, this model of territorial integration carried out by the private sector with state support has always been the predominant one in the relations between Brazilian socio-spatial formation and its

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African correlates, and a historical recovery of this oscillating movement of approximation shows, even with nuances, that the routes currently designed for submarine cables follow the same pattern that has been in force since the beginning of the slave trade in the 16th century.

The Brazil-Africa territorial integration: from the Atlantic slave trade to the internet

> [...] the reconstruction of successive temporal systems and successive spatial systems is a fundamental data when looking for an explanation for the current situations. (Santos, [1978] 2002, p. 255).

> [...] the knowledge of successive technical systems is essential for the understanding of the various historical forms of structuring, functioning, and articulation of the territories. (Santos, 1996, p. 171).

In different passages of two of the main works of his academic trajectory, the geographer Milton Santos draws attention to the non-accessory role that History possesses in the geographical interpretations of the contemporary world. In the case of the Internet and submarine fiber-optic cables that structure it, analyzing the succession of technical integration systems between Brazil and the African continent is fundamental to understanding why the current routes and landing points were chosen for these undersea cables at the banks of the two continents. Thus, the current geography of the internet inevitably enters the history of an economic system with almost 5 centuries of unfolding and displacements (Arrighi, 1996), articulating places and agents in a totalizing movement like Santos (1996) defended to be read in any geographical phenomenon.

There are two submarine fiber optic cables currently operating between Brazil and the African continent, in addition to one already installed and another in the project stage. Although with a very reduced capacity to the current standards of traffic, the cable Atlantis-2, connecting Fortaleza and Lisbon (in Portugal), began operation in 2000 and was the first submarine fiber optic cable connecting the Brazilian coast to the African coast, since it has landing points in Praia (Cape Verde) and Dakar (Senegal). The other three cables linking the Brazilian territory to Africa, better detailed in the next item of this article, have as routes: (1)

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Fortaleza-Sangano (in Angola), already in operation (2) Fortaleza-Kribi (in Cameroon), already installed; and (3) Fortaleza-Cape-Town (in South Africa), still in the project stage. All the cited cables (Map 1) remake, to a greater or lesser degree, the historical routes of contact between Brazil and Africa, from the beginning of the Atlantic slave trade and also through the increase of trade from the 1960s.

If the first fiber-optic submarine cable to connect the two continents has Cape Verde and Senegal as landing points, it was also in this region of the African coast, where today is the State of Guinea-Bissau, which began the Atlantic slave trade in direction to Brazil, in the 16th century (Verger, 1987). In general, such Atlantic routes between the Brazilian and African coasts were "buoyed by the wind, channeled by the currents and patterned by the seasons" (Alencastro, [2000] 2008, p. 57), althought for Florentino ([1995] 2002) the seasonality of the traffic responded more to the demand for enslaved labor, to the productive cycle and to the economic strategies derived from it, than to the meteorological and navigation conditions themselves.
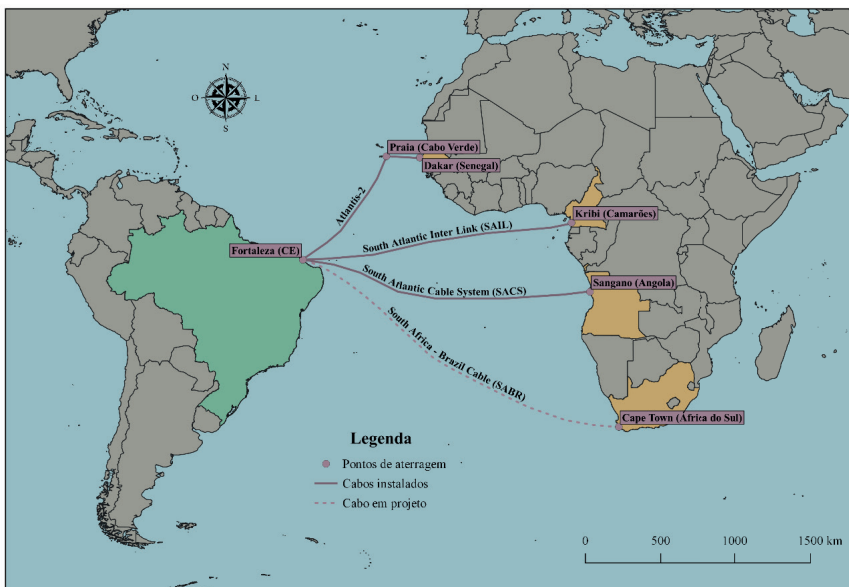
Map 1 - Fiber optic submarine cables between Brazil and the African continent

Elaboration: Antonio Gomes de Jesus Neto

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From the seventeenth century, the sugar economy of the Brazilian northeast began to seek enslaved labor, especially in Luanda, on the Angolan coast (Verger, 1987), forming an "open route between the two shores of the sea by currents and complementary winds" (Alencastro, [2000] 2008, p. 61). After that, Angola and Congo became the historical regions for the supply of slaves to Colonial Brazil (Alencastro, [2000] 2008; Florentino, [1995] 2002), also spreading traffic to other Brazilian ports in Pará, Maranhão, Ceará, and Rio de Janeiro.

In spite of this diffusion of the traffic coming from the Congo-Angolan region to other Brazilian ports, from the 18th century the mining cycle sealed the specific approximation of Bahia with West Africa (especially the Gulf of Guinea), especially with the port of the Costa da Mina (Ghana) and the coast of Benin (Verger, 1987). Besides these routes, it is also emphasized, in the 19th century, the beginning of the slave trade from the ports of Mozambique (in the Indian Ocean), especially towards the port of Rio de Janeiro, which at the time became the main slave port of the Brazil Empire for its strategic position in relation to the nascent coffee plantations (Magalhães, 2010).

Such a structure, from what we can call a first "violent integration" of the Brazilian territory with Africa, was basically operated by private traffickers supported by the nation states[8], in an articulation between the main centers of historical accumulation of the capitalism until the beginning of century 20th studied by Arrighi (1996). According to Florentino ([1995], 2002), the ships were the private property of the traffickers, who often grouped them in companies and carried goods[9] for bartering for slaves on the African coast, influencing government decisions[10] and forming a highly concentrated "integration" system in a few large shipping companies responsible for most of the flow of goods and enslaved people circulating in the South Atlantic.

With the end of the trade in the mid-nineteenth century, this (until then violent, necessary strengthening) integration between Brazil and the African continent ceased until the 1960s, resuming during the government of Jânio Quadros as attested by several authors such as Santana (2003), Brasil (2016), and Almeida (2017). Combining a diplomatic discourse by the decolonization of the African countries with an economic discourse of intensified trade between the countries of the South as an alternative to the crisis of capitalism, the foreign policy promoted by the government

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of Jânio Quadros was responsible for the introduction of Brazil in the so-called "South-South relations" (Santana, 2003, p. 114), and in spite of the comings and goings during the military period and the re-democratization, gave the tone of the new type of territorial integration between Brazil and the African states, then in processes of independence.

Such integration, however, was about the routes followed in the Atlantic slave trade, and were again Senegal, the Gulf of Guinea and southern Africa (notably Angola and South Africa) the main points of Brazilian trade in the African continent[11]. Again, South Atlantic integration would be highly concentrated in large (now multinational) maritime operators whose activity has also been stimulated and facilitated by national states (Santana, 2003; Lima, 2015), but a new variable of territorial integration came to coexist with ocean navigation: the air modal, that, in some cases, is operated by state companies, and with greater emphasis on passenger transport. The main ports and airports involved in this dynamics of integration in the last 10 years, to be detailed in the following paragraphs, can be briefly visualized in Map 2.
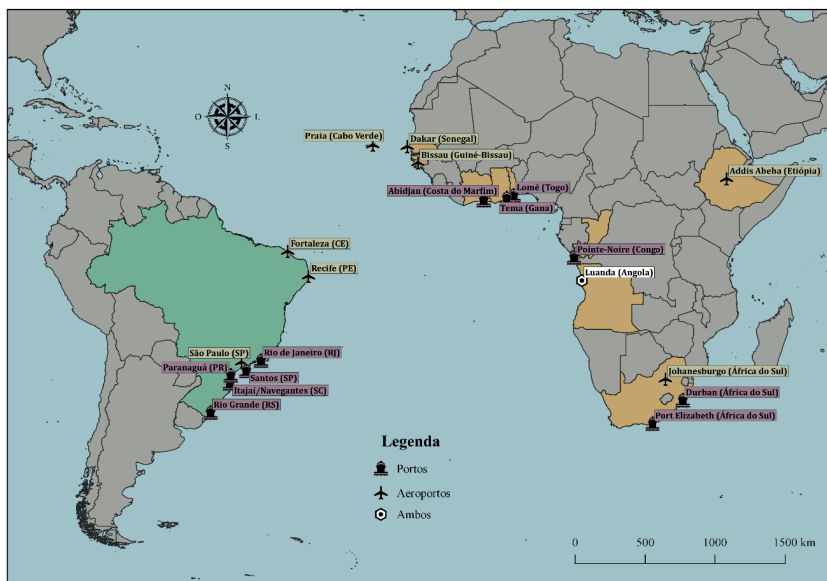
Map 2 - Ports and airports with direct routes between Brazil and Africa (2008-2018)

Elaboration: Antonio Gomes de Jesus Neto

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In the case of air integration, Santana (2003) and CNI (2008) indicate the existence and disappearance, between the years 1970 and 1990, of direct flights between Brazil and cities like Lagos (Nigeria), Abidjan (Ivory Coast), and Maputo (Mozambique), all located in the Gulf of Guinea or in Southern Africa, historical routes of contact between the Brazilian territory and the African continent. Currently, the main Brazilian airport that connects with Africa is Guarulhos Airport, in São Paulo, with weekly direct flights to Johannesburg (South Africa) [12], Luanda (Angola) [13], and Addis Abeba (Etiopia) [14]. In addition to these, there is a route of the Cape Verdean airline TACV, connecting the Brazilian northeastern cities of Fortaleza and Recife to Praia (Cape Verde), Dakar (Senegal) and Bissau (Guinea Bissau).

In the case of maritime transport, the routes currently traveled by multinational (mainly European) maritime operators also do not escape the historical pattern of integration between Brazil and the African continent, and Table 1 indicates a recurrence of ports located in southern and southeastern Brazil connecting to ports located in the Gulf of Guinea, Angola, Congo and South Africa (often having as a starting point the port of Buenos Aires in Argentina).

The process of territorial integration between Brazil and the African continent, which was initiated in a violent manner with the Atlantic slave trade still in the XVI century, acquires new contours in the 1960s. New sea and air commercial routes of integration between the two shores of the South Atlantic emerged on the basis of the old routes of the slave trade.

From the beginning of the 2000s, however, the combination of an unprecedented rapprochement between the Brazilian government and the African states from the Lula administration (Brasil, 2016) with the centrality acquired by the Internet in the world economic system as punctuated in Davenport (2012), have opened space for a new form of territorial integration, now based on information and submarine fiber optic cables, although inexorably associated with the historical construction of transoceanic routes between Brazil and Africa.

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Company	Brazilian Ports	African Ports
Maersk Line	Rio Grande, Itajaí/ Navegantes, Santos, and Rio de Janeiro	Lomé (Togo), Pointe-Noire (Congo), and Luanda (Angola)
Hamburg Sud	Rio Grande, Itapoá, Itajaí/ Navegantes, Paranaguá e Santos	Port Elizabeth (South Africa)
Nile Dutch	Rio de Janeiro	Pointe-Noire (Congo)
CMA CGM	Santos	Abidjan (Ivory Coast), Tema (Ghana), Pointe-Noire (Congo), and Luanda (Angola)
Asas Service	Rio Grande, Paranaguá, and Santos	Port Elizabeth (South Africa)
Asas Combined	Rio Grande, Paranaguá, and Santos	Port Elizabeth and Durban (South Africa)

Table 1 - Direct sea routes between Brazil and the African coast between 2008 and 2015

Source: CNI (2008) and Lima (2015).

The nascent geography of submarine cables between Brazil and the African continent[15]

The global geography of submarine fiber-optic cables is, above all, marked by great regional inequality. Until recently, the supply of infrastructure and traffic capacity in these cables was highly concentrated in the North Atlantic and Pacific (with the US as the main hub), but Malecki and Wei (2009) call attention to what they called a recent "Shift to Asia", where the connection between the eastern countries of the continent is responsible for most of the current cables under construction. Concomitantly, in a context of unprecedented relations between the southern states of the world as signaled by Fiori (2007), there is also a tendency for decentralization of the construction of submarine fiber optic

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cables to other regions of the globe, and it is in this process that the cables connecting Brazil and the African States appear.

Until now, the informational integration between these territories was, using the pair of concepts proposed by Santos and Silveira (2001), much more viscous than fluid, although in times of the velocity imaginary (Santos, 2000) such viscosity is verified in the milliseconds scale. Especially on the African continent, where satellites still persist as the main form of Internet connection (Malecki and Wei, 2009), this viscosity increases as it moves from large urban centers towards cities and more remote areas, a phenomenon that in some measure is repeated in Brazil (mainly in the Amazon). Warf (2010, p. 45) even writes about a "digital divide" between the African coast and the interior of the continent, thus corroborating Santos (2000) analysis on the selectivity intrinsic to fluidity found in the territories.

In addition to an increase in informational fluidity (even if selective) between Brazil and the African States, it is important to keep in mind also a certain continuity between the process of construction of these cables and the historical process of territorial integration presented previously. As in the structure of the slave trade and commercial exchanges since the 1960s, "submarine cables have always been mostly private enterprises" (Malecki; Wei, 2009, p. 366) even though in all these forms of integration States have always had a crucial role. In the same way, the routes chosen for the newly installed or projected cables respect, to a greater or lesser extent, the main historical routes of integration between Brazil and the African continent, that according to Alencastro ([2000], 2008) has its most remote origins in the navigation conditions provided by the south-Atlantic winds (Map 1).

The first of these newest submarine cables, already in operation, is the South Atlantic Cable System (SACS), interconnecting the Angolan coast in Sangano, south of Luanda, to the Brazilian coast in Fortaleza. Conducted by the largest telecommunications company in Angola (Angola Cables), by the Japanese government and by the Japanese technology company NEC, the 7,500km cable is part of a larger system that includes building a data center on Praia do Futuro (in Fortaleza), where SACS will connect to Monet cable, which connects Santos to Miami via Fortaleza[16]. In addition, the SACS proposal is to enhance information flow across the West Coast of Africa and the US through the West Africa Cable

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System (WACS) [17], route that until recently was only possible through the European cable system.

The second of these submarine cables, already installed (and expected to go live soon), takes advantage of the historic Atlantic route between the Brazilian coast and the Gulf of Guinea, and is part of another geopolitical strategy, involving different agents and objectives. Designed in a partnership between telecommunications giant China Unicom, also China's Huawei Marine, China Exim Bank, Cameroon telco Camtel and Spain's Telefonica, the South Atlantic Inter Link (SAIL) also lands in Fortaleza, but this time leaving the beach of Kribi, on the south coast of Cameroon. Like SACS, rather than connecting Brazil to Africa, the ultimate goal of SAIL is to provide an information route from China to Latin America, passing through the interior of the African continent (where the Asian country also builds backbone infrastructures) without having to go through data centers in Europe and the US, indicating that the aforementioned importance attributed to the Internet in the world economic system (Davenport, 2012) is already beginning to gain explicit geopolitical contours.

Finally, and still in embryonic phase, the last of the cables in project closes the system of historical routes and should interconnect Fortaleza to Cape Town (South Africa), also placing the southern tip of the African continent in the Brazilian system of submarine cables just as it was with the traffic between the ports of Rio de Janeiro and Mozambique in the 19th century, and as it is today the main air route of this integration (São Paulo-Johannesburgo). Initially named SABR (initials of South Africa and Brazil), the cable must be connected to the already in operation Seabras-1, built and operated by the US Seaborn Networks, which directly connects the 2 main financial centers of the Americas: São Paulo and New York. Besides connecting, via Fortaleza, these financial centers to its main correspondent on the African continent (Johannesburg), SABR also includes a branch to Argentina (ARBR), and a direct connection with India through a cable constructed by the Indian IOX[18].

Thus, in general, the three most recent submarine fiber-optic cables between Brazil and the African coast are, in fact, crucial stretches of much broader global information integration strategies. And although they are consolidated as a new dimension of South-South Cooperation, they are mainly part of economic arrangements and geopolitical disputes

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involving large corporations and different states, with emphasis on the United States of America, China, and India. These new information routes, in addition to reinforcing the historical routes of integration between Brazil and the African continent, also reinforce Fortaleza's role as the main hub of submarine cables in the Brazilian territory, mainly because of its geostrategic location in relation to the northern hemisphere where many of the world's fiber-optic submarine cables are located.

Final considerations

From the Atlantic slave trade to the Internet, through trade from the 1960s, the territorial integration between Brazilian socio-spatial formation and its African counterparts has historically gone through four main South Atlantic routes, starting from specific points in the Southeast and Northeast Brazil in the direction of 1) region of Senegal, Cape Verde and Guiné-Bissau, 2) to the Gulf of Guiné, 3) Angola and Congo and 4) to the extreme south of the African continent. In addition to this recurrence of old routes, such integration has also almost invariably been a private enterprise, and even if one can not compare trafficking violence with post-1960 relations, it is always private agents who are their greatest direct beneficiaries. Even with this emphasis on private agents, we must not forget the ever central role of the states in this integration, now facilitating and sometimes stimulating and regulating the main operators of the circulation and communication of these routes between Brazil and Africa.

If the commercial and private nature of integration is also true for submarine fiber-optic cables, it is possible, however, to envisage other uses for them: through the National Research Network (RNP), the national academic network of Brazil, it is projected the use for research and education of a band of the (also atlantic) cable planned to connect South America to the European Union – the ELLAlink; and through AmLight, a pan-American consortium of academic networks of which the ANSP Network is a part, a memorandum of understanding was also signed with Angola Cables so that part of the SACS band is dedicated to academic use. Thus, despite its unquestionable commercial importance, the internet can still stimulate a new form of territorial integration between Brazil and African States, less focused on large corporate interests and more focused

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on the public and non-commercial interests of populations on both sides of the South Atlantic.

Notes

1 This article is the result of a research conducted between 2017 and 2018 in the Center for Applications in Advanced Networks (NARA), headquartered at the Medical School of USP (FMUSP), within the academic project ANSP (An Academic Network at São Paulo - <www.ansp.br>), FAPESP award nº 17/17084-3. The ANSP Network is an academic network that, among other activities, provides Internet access to teaching and research institutions in the State of São Paulo.

2 There are records of old submarine telegraph cables linking Brazil to Africa, but the lack of good bibliographical references prevents for the moment a deeper look at this type of territorial integration.

3 The *"bits",* basically ausence or presence of information (0 ou 1).

4 *Dense Wavelength Division Multiplexing.*

5 Almost always installed on a beach on the sea coast.

6 Corresponding to 12 nautical miles, or 22km, contiguous to the maritime coast.

7 Corresponding to 200 nautical miles, or 360km, contiguous to the maritime coast.

8 Formally established in the Treaty of Westphalia (1648).

9 Such as textiles, weapons, tobacco, cachaça, sugar and etc.

10 That, in turn, besides enacting laws that were in accordance with the interests of the traffickers, obtained revenues from the Atlantic slave trade from a customs system in the Brazilian ports.

11 Santana (2003) highlights Brazil's so-called *countertrade*, in the 1980s, with Nigeria and Angola, in which these African countries daily export thousands of barrels of oil in exchange for Brazilian products or services.

12 Operated by South African Airways and Latam

13 Operated by Angolana TAAG.

14 Operated by Ethiopian Airlines.

15 Given the topicality of the phenomenon, still in the incipient process, the factual information of this item was extracted mainly from journalistic reports made on the Internet during the years 2017 and 2018, in portals such as TeleSíntese, TeleGeography, Macauhub, Diário do Nordeste, and Exame.

16 Already in operation and built by Angola Cables in partnership with other private corporations.

17 Of which Angola Cables is one of the largest shareholders.

18 Recently, the same IOX signed a capacity-sharing agreement with Angola Cables, aiming at an interconnection with SACS as well.

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