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TELECOMS INFRASTRUCTURE II

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Access to broadband for the use of Internet is fundamental for the improvement of the current digital society, being the cause and consequence of the countries' social and economic development. However, peripheral locations and rural regions are subject to conditions that hinder that access, such as residential geographic dispersion, the lack of scale for final consumers and technical and economic unfeasibility of implementing telecommunications infrastructure.

According to the results of the survey on the use of information and communication technologies in Brazilian homes ("TIC Domicílios 2019"), carried out by the Regional Center of Studies for the Development of the Information Society (Cetic.br) with the institutional support of other organizations, 71% of Brazilian homes have access to the Internet. However, when looking at the urban and rural areas, there is a large discrepancy because, while 75% of the homes in the urban area have Internet access, only 51% of homes in the rural area have such access.

Taking into account the aforementioned data, it is necessary to observe the 2020-2023 Multi-annual Plan (PPA), approved by Law No. 13,971/2019, which is intended to organize and enable the performance of the Federal Public Administration, guiding the State and society towards fulfilling the fundamentals and objectives of the Brazilian Republic.

Among the programs brought by the PPA, it should be noted that "Conecta Brasil" intends to promote universal access and expand the quality of the country's communications services, with the goal of expanding broadband internet access for Brazilian homes from 74.68% to 91.00% by 2023.

In addition, the provisions of Decree No. 9,612/2018 establish that one of the general objectives of public policies of communications is to promote access to communications in economic conditions that enable the use and enjoyment of services, especially for the expansion of access to fixed and mobile broadband internet, with adequate quality and speed; and to expand broadband internet access in areas where the offer is inadequate, such as underserved, rural or remote areas.

In the same regard, the 2015-2024 Strategic Plan of the Brazilian National Telecommunications Agency - ANATEL, published in February 2015 and updated in April 2020, establishes objectives and strategies that will allow the improvement of the Agency's actions and the effective fulfillment of its institutional mission.

Among its objectives, it is highlighted the need to promote access to communications, enabling the expansion of access and use of these services, with adequate quality and speed, in addition to affordable prices and satisfactory quality. Its strategic objective of increasing the percentage of homes with broadband in rural areas from 44.00% to 73.04% by the end of 2023 aims to reach a significant portion of the society that is still marginal as to the communications sector, mainly by people with less purchasing power, living in areas where the offer is inadequate.

Although optical fiber (discussed in a previous article), mobile networks and other cables, wires and terrestrial telecommunications infrastructure equipment are essential for the provision of communications services, it is true that the goals referred above require alternative connectivity and internet access options, capable of reaching places that are difficult to access, such as the rural area, to overcome the difficulty of installing such equipment.

In order to achieve this objective, satellite technology seems to be a viable and recommendable possibility to expand the use of Information and Communication Technologies (ICTs) in rural areas. The satellite data transmission network has developed considerably in recent decades and it works from a satellite that hovers in space and that transmits signals to satellite dishes and other devices, creating a kind of data “bridge” between the satellite, the user and the central server of the satellite broadband distributor.

Despite the possibility of oscillations, satellite technology is usually more stable and can reach speeds comparable to cable broadband (generally ranging from 10 to 20 MBps, but there are plans that can even reach 25 Mbps). Also, it should be noted that the maximum speed provided by the satellite depends on the frequency band in which it operates.

In Brazil, most satellite offers in the Brazilian market are based on the C and Ku bands. However, currently, technological advances have allowed to increase the quality and the capacity of the provision of broadband services via satellite operating in the Ka band, which uses multiple signal beams and allows optimization of radio frequencies, having greater communication capacity and speed compared to others bands.

Therefore, according to the ANATEL’s data

panel on Brazilian and foreign satellites in commercial operation in Brazil, together with the updated list of satellites authorized to operate in Brazil, it is possible to verify that the Ku and C radio-frequency bands (unplanned) are the most expressive in the national territory (totaling around 65 satellites), with 13 satellites in commercial operation (or coming into operation soon) in the Ka band and other less expressive numbers in L and X bands, among others.

Some companies have sought a higher volume of satellite capacity to compete in the Brazilian broadband market. This was the case, for example, of Hughes do Brasil, a subsidiary of the American group Echostar, which carried out a joint venture with Yahsat (satellite operator of the Arab investment fund Mubadala) to provide connectivity services to broadband internet through the combination of 65 Gbps of capacity in Ka band.

Since 2016, Hughes has boosted the business of rural producers and local Brazilian entrepreneurs through broadband access via satellite, contributing to bring Internet and communication to end consumers in remote areas. Recently, with the ANATEL's approval to offer its solutions via the Ka-band satellite "JUPITER 3", to be launched in the second semester of 2021, Hughes further reinforces the potential of its services, offering even higher speeds and even better performance.

Another example at a practical level is the Geostationary Satellite of Defense and Strategic Communications (SGDC), operated by the companies Telebras and Viasat (through a partnership model, based on Article 28, §3, item II of Law 13,303/16 - State-Owned Companies Act), which brought broadband to about 1 million students of the Brazilian public network, who lived in places without Internet or where the signal was extremely slow.

Although the partnership contract between Telebras and Viasat has been the subject of controversies, which have even reached the Federal Supreme Court, currently, the use of the SGDC is "unlocked" and the US satellite operator Viasat reached a coverage of 93% of the Brazilian population, with 90% of its base in Brazil being in municipalities with less than 50 thousand inhabitants, demonstrating that the greatest demands come from more remote locations.

In 2021, the operator still intends to launch the ViaSat-3 class satellite, which should allow even greater capacity to Brazil, together with the SGDC. Although, recently, a conflict between Claro and Viasat has arisen for the satellite exploitation of the 70° West position with the Ka band (already destined to Claro through Star One – Embratel, for the satellite Star One D2), the dispute appears to not interfere in Viasat's plans in Brazil for 2021, which has already clarified that it

intends to launch said satellite in the 89° West orbital position.

It should be noted that the SGDC also focused on distributing and implementing connectivity services to remote locations in Brazil through a partnership between Viasat and Ruralweb; and, within the scope of the partnership between Viasat and Telebras, SGDC started to offer high-speed broadband solutions to leverage smart agriculture and agribusiness, allowing farmers to have access to residential or corporate services to expand the use of technological solutions in their businesses, especially those related to the Internet of Things (IoT).

Also, the internet via satellite is compatible with smart IoT devices related to precision agriculture, capable of optimizing the time and logistics of agricultural machinery through management software, sensors and robots that detect losses in the process of production and environmental impacts, among others.

In this regard, the expansion of Claro's IPSat in 2019 - broadband service operated from the Star One D1 satellite - aimed at serving farms and agribusiness groups, allowing applications in IoT in locations with little or no telecommunications infrastructure. Thus, satellite technology increases the efficiency of harvests, professionalizing the planting of crops and the creation of herds and optimizing the production and profits of the agribusiness industry.

However, it should be considered that other technologies, such as 5G, can cause changes in the ecosystem of satellite solutions, such as possible interference in the extended C band, affecting the transmission of satellite TV (TVRO), as discussed in a previous article. Thus, it is possible that adaptations are necessary to ensure coexistence between satellites and 5G, making the most of the advantages and potential of both.

The new generations of satellites developed and launched in space are revolutionizing the concepts of speed, latency and capacity of satellite communications, enabling not only an expansion of broadband access for the final consumer, reducing the digital inequality and coverage deficiencies, but also allowing the development of the IoT sector and technologies such as 5G (with adaptations for coexistence), as well as the entry of new service providers in the telecommunications market, proving the potential for Brazilian socioeconomic improvement through satellite technology.

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