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## **ACTIVISM IN LANDSCAPES – CULTURE, SPECTRUM AND LATIN AMERICA**

In January 2013, an ordinance was published by the Public Prosecutor's Office of Campinas (SP, Brazil) initiating a civil investigation against Rádio Muda FM, a free and independent radio station with its studios in the State University of Campinas.<sup>1</sup> The investigation was initially based on the 9.472 Bill of 1997 which states that one who “develops telecommunication activities clandestinely” could face up to eight years of detention. This situation, far from being unique to Rádio Muda, is a regular practice towards unlicensed radios in Latin America. Hence, the criminalisation of small-scale broadcasters shows us what is at stake when it comes to the use of the common good under the responsibility of the state. This sort of privatisation of radio space is also a criminalisation of aesthetics, as the infrastructure used by many to express themselves is determined by institutions. Consequently, the free use of a technically open infrastructure and the alternative organisation of parts of society are being rendered illegal.

Rádio Muda FM is one of the oldest and more important examples of autonomous communication in Brazil and it is a reference for activist movements that face criminalisation. More than a judicial affair, this implies an epistemic imposition based on the seizure of radio space, on techno-managerial colonialism and on socio-cultural restraints. The defensive position of alternative media should be turned into

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1 Dating back to the mid-eighties, the radio was part of the movement for the construction of student houses, hosted a series of cultural events, campaigns and concerts in the nighties and was fundamental for the whole cultural and communicational movement during the 2000's. The radio was present at the first World Social Forums in Porto Alegre, helped to create the free radio network, offered workshops and courses and harvested a partnership with many social movements and activists. Technically speaking, it was one of the first radios in Brazil to have a website, was the first free radio to broadcast via streaming on free software and hosted the first independent trial of digital television in Brazil.

propositions, which shift the inner perception of what radio phenomena are and what they might be. The matrices of colonial domination of space and natural resources, language and oral tradition, knowledge and subjectivity are all included in the problem of understanding the materiality of techno-politics of the electromagnetic spectrum.

## LANDSCAPES

The importance of the visual and sonic waves in general and the electromagnetic spectrum in particular should be understood as landscapes in the formation of a geo-cultural knowledge.<sup>2</sup> Landscapes must therefore be understood as space in motion and construction where nature and culture reconcile in the curvature of its material and spiritual relief. The concept of the landscape should be viewed as a dynamic nature where the twists, curves, folds and modifications shift the field of vision proposing new optics.

Landscape here is seen as a procedure of symbolic and practical action. It features oscillation and reverberation of space and reconciliation (and often inversion) between being and non-being, between culture and nature and between the technical and the aesthetic. Against a radical epistemological clash between multiculturalism and multinaturalism<sup>3</sup>, the lack of landscape then, should be related to pure destruction. The silence, the aftermath of a bomb explosion or the following moment of disaster is that non-landscape. As an absence of time in space, this lack is the impossibility of culture or the slaughter of nature, which is, as we want, very close to one another.

The term landscape is a translation of the French term *paysage* (similar in all Latin-based languages), which, by its turn, comes from the Latin root *page(n)sis* – meaning the inhabitants of a rural or country district or region (*pagus*), from where also the word *peasant* comes from. The French *pays* – meaning region or territory – added by the suffix *age* – meaning action or the result of an action – would end up as a combination or consequence of the motion or action of the territory, particularly that

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2 Rodolfo Kusch, *La Geocultura del hombre Americano*, Buenos Aires, Fernando García Cambeiro, 1976.

3 Defined by Eduardo Viveiros de Castro, based on Amerindian cosmology, multinaturalism would be “uma unidade do espírito e uma diversidade dos corpos. A cultura ou o sujeito seriam aqui a forma do universal, a natureza ou o objeto a forma do particular. [...] elas não assinalam regiões do ser, mas antes configurações relacionais, perspectivas móveis, em suma – pontos de vista.” (De Castro, Eduardo Viveiros. *Perspectivismo e Multinaturalismo na América Indígena*. In *O que nos faz pensar*. Nº 18, 09/2004, p.226). Translated by the authors as: “a unity of the spirit and a diversity of bodies. The culture or the subject would be here the form of the universal, the nature or the object the form of the particular. [...] they do not assign regions of the being, but before, relational configurations, mobile perspectives, to sum up, points of view.”

inhabited by rural folk.<sup>4</sup> Therefore, what is ‘escaping’ or moving within this context is not just the ‘land’, but also energy, matter and cultural entities, which fill the space with the information it contains.

Amálio Pinheiro says that Latin America and the Caribbean, “could never exclude of its cultural and scientific production the mass of information coming from the forces of nature”.<sup>5</sup> This inclusion of nature in the common production of societies would be a denial of the separability and categorization, which are typical of the modern condition.<sup>6</sup> What is at stake in this “baroque procedure” of the American expression would be the “various instances of translations between the voice and the landscape.”<sup>7</sup> As opposed to a Western perspective, which separates the natural beauty and the artistic beauty, the line adopted by a certain Latin American perspective seeks to determine a contiguity between what the numerous forms and formats of expressions are and what the natural infrastructure that makes all culture possible is: “The blend of this revelation with its coincidence with the men is what marks the sovereignty of landscape.”<sup>8</sup>

Therefore, the epistemological challenge presents itself as a task to formulate a mode of thought that sees in the landscape and its features an element, which is social, aesthetic, political, technical and material. Moreover, it is a political task to embrace the commons of nature and natural resources as part of a battle for the infrastructures of speech, expression and sensibility.

## DECOLONIAL NATURES

In “archaic societies”, says Felix Guattari, the expressive forms were connected to “complementary segments of subjectivity [...] connected to a range of expressive and practical registers in direct contact with social life and the outside world.”<sup>9</sup> The practical references of function, procedure and technicality are related to an artistic, religious and ritual

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4 See: Paisagem: Dicionário Etimológico Nova Fronteira da Língua Portuguesa, pp. 572. Pays: Centre National de Ressource Textuelle et Lexicale - <http://www.cnrtl.fr/definition/pays> & Peasant: Online Etymology Dictionary <http://www.etymonline.com/index.php?term=peasant>

5 Amálio Pinheiro, “O jornal na paisagem.” in Karla Brunet, Raquel Rennó (eds.), *TROPÍXEL: Arte, Ciência e Sociedade*, Salvador, EDUFBA, 2015, pp. 87-109, p. 89. All quotations from Pinheiro, 2015, are translated by the authors. The pages refer to the original in Portuguese.

6 Cp. Bruno Latour, *Jamais fomos modernos*, São Paulo, Editoria 34, 1994, p. 139.

7 Pinheiro, 2015, p. 92.

8 Lezama Lima, *A expressão Americana*, São Paulo, Editoria Brasiliense, 1988, p. 171. All quotations from Lima, 1988 are translated by the authors. The pages refer to the original in Portuguese.

9 Félix Guattari, *Chaosmosis. An ethico-aesthetic paradigm*, translated by Paul Bains and Julian Pefains, Bloomington, Indiana University Press, 1995, pp. 98f.

belonging. More recently, the segmentations of activities and components of social life became a capitalistic “reified individuation” standardized by mass media, binarization, mechanisation and a “language rigorously subjected to scriptural machines.”<sup>10</sup> Guattari proposes then an “aesthetic paradigm” as being transversal to other universes of value, which might conduct to a “re-enchantment of the expressive modalities of subjectivation”<sup>11</sup> operating “if not a direct contamination of other domains then at least highlighting a re-evaluation of the creative dimensions that traverse them all.”<sup>12</sup> In this sense, this aesthetic perspective relates to the machinic and techno-scientific creativity since one is able to undo “mechanist visions of the machine and promote a conception which encompasses all of its aspects: technological, biological, informatic, social, theoretical and aesthetic.”<sup>13</sup>

This idea of having aesthetics as expression and sensation of oneself is a central element in order to think of resistance as well as a differentiated mode of thought particularly fertile in the history of Latin American subcontinent. The reports of the encounter between the first Europeans and the Americas describe a marvellous event for the senses, astonishing perception of the people as part of the environment and a mad economic interest in natural infrastructure:

“there are many sierras and high mountains beyond comparison [...] all most beautiful and of a thousand different shapes and all accessible and covered in trees of a thousand kinds and so high that they seem to reach the sky; [...] I saw that they were as green and as beautiful as they are in Spain in May, and some were in flower and some in fruit, [...]. There are marvellous pine groves and broad meadows, and there is honey and there are many different kinds of birds and many varieties of fruit. In the interior there are many mines of metal and incalculable numbers of people. [...] the fields and the land are so beautiful and rich for planting and sowing, for raising all kinds of cattle, for building towns and villages. The harbours are beyond the belief of anyone who has not seen them, and the many great rivers give good waters of which the majority bear gold. [...] On this island there are many spices and great mines of gold and other metals.”<sup>14</sup>

The physical European expansion brought a symbolic spectre that, in its

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10 Félix Guattari, 1995, p. 104.

11 Ibid., p. 105.

12 Ibid., p. 106.

13 Ibid., p. 107.

14 First Letter of Cristopher Columbus; Cristopher Columbus, 1493, “Santagel Letter”, in Research at King’s College London, Early Modern Spain, 2005. Available at: <http://www.ems.kcl.ac.uk/content/etext/e022.html> [accessed June 22, 2016].

consequences, would go beyond previous imaginaries. From that moment on, this new imaginary would challenge the regular explanation of things, the ordinary comprehension of the world and twist the optic to an expanded field, provoking a kind of distortion on the senses. The dark side of renaissance<sup>15</sup> turned into a newborn subverted modernity.

This shift in perception was caused by the encounter with the – natural, spiritual and human – other. The responses and resistance came, according to Michel de Certeau, as tactics. In his perspective, tactics refers to ordinary acts and speeches that defy the construction of a domination and the matrices of power. While strategy is able to produce, map and impose, the tactics can use, manipulate and alter. The idea of tactic is linked to focused spatial practices, resistance, uprisings, surprises, while the notion of strategy is a calculus operated by the idea of a homogeneous whole modelled by totalitarian perspectives that separates subject from object.

A seminal influence of Michel de Certeau's visions on the ordinary man can be found in a chapter called “*Ethno-Graphy: Speech, or the place of the other: Jean de Léry*”. Thus, his tactical perspective comes from the act of “taking over the speech”<sup>16</sup>. The main expression of this tactic is focused on oral tradition (of the amateur, the foreigner, the native) and its deceived interpretation by dominators. The sound and the auditory experience alters the disposition of the listener. This sort of wild speech is “a crucial tactic for insinuating the other in the place of writing.”<sup>17</sup>

Naming and writing, although important, are less decisive than the speech, the spoken word and the oral experience. In the act of speaking, orality becomes the word, which reverberates through vibrations on space, fulfilling that landscape: “the reach of this *word* instituted in the place of the other and destined to be listened in a different form than the one which speaks.”<sup>18</sup> This sort of everyday practice, this savage (other) orality which is an “absent jewel, a moment of enchantment, a stolen

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15 Walter D. Mignolo examines the role of language in the colonial domination in: Walter D. Mignolo, *The Darker Side of Renaissance: Literacy, Territory & Colonization*, Ann Arbor, University of Michigan Press, 2003.

16 “La prise de parole” in French is the name of a piece in which Certeau analyses the events of May 1968 in Paris. Differently translated in English as “capture of speech”, it is a quote much used in Free Radio movement in both Brasil and France. Cp. Coletivo Rádio Livres Populares, *As Rádios Livres*, 2003. Translated by Thiago Novaes and Raphael Maureau. Available at: [http://www.radiolivres.org/sites/radiolivres/files/rádios\\_livres\\_traduzido.pdf](http://www.radiolivres.org/sites/radiolivres/files/rádios_livres_traduzido.pdf) [accessed March 1, 2016]. From the original Collectif Rádios Livres Populaires, *Les Rádios Livres*, Paris, Maspero, 1978.

17 Ben Highmore, Michel de Certeau, *Analysing Culture*, London and New York, Continuum Press, 2006, p. 73.

18 Michel de Certeau, *The Practice of Everyday Life*, Berkeley, University of California Press, 1984, p. 214.

instant, an out of the text remembrance”<sup>19</sup>, is an aesthetic shock for its peculiarity. It is a new conceptual aesthetic and an alternative epistemology, “for the vocal exteriority is also the stimulus and condition of its scriptural opposite.”<sup>20</sup>

Thus, the critical exploration of radio can be an act of decolonisation if we understand it as a response to the “colonization of cognitive perspectives, modes of producing and giving meaning, the results of material existence, the imaginary, the universe of intersubjective relations with the world.”<sup>21</sup> The notion claims for an “epistemic disobedience” and infiltrates different aspects of either theoretical debate or practical activism. By adding to the domination of the symbolic sphere topics such as nature, aesthetics, technology and materiality, we want to enhance the debate and introduce a sort of decolonial communication concept.

If for Hegel, nature is “absolute prius”, a reality that prepares the spirit and does not participate in its formation, that is, pure geography or pre-history, for Jose Lezama Lima, inversely, in the letters of *conquistadores*, “the wonder is dictated by the very nature, by a landscape that is anxious to express, offered itself for the baffled missionary, for the stunned student, making the adventure to break the conclusion of the language degree.”<sup>22</sup> Lezama's work can be read as a ‘generalized anti-hegelianism’.

The corpus of Lezama's work moves around an epistemology of the form of the Americas and also as a criticism of the ontological and historicist Hegelianism. He searches for a particular form of expression, constantly constructed by an *Imago* drew by a “unique geography, a nature which, prior to history, prefigures it as spiritual unity.”<sup>23</sup> Therefore, space, geography and landscape are crucial elements to understand his narrative as well as points, which mark his difference from Hegel's perception of the inertia of nature, its a-historical tendency: “The gnostic space is the nature spiritualized, fraught of gifts of its own, that awaits to express itself in the sign of men to begin the immediate dialogue that impulses culture.”<sup>24</sup>

The character used by Lezama to describe the initial moments of the construction of the American expression is the “Sir Baroque”, “first american [...] dominant of its torrents” who “enjoys the language as he

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19 Ibid., p. 215.

20 Michel de Certeau, 1984, p. 235.

21 Anibal Quijano, “Coloniality of Power, Eurocentrism, and Latin Marica, *Nepantla: Views from the South*, Vol. 1, Issue 3, Durham, Duke University Press, 2000, pp. 553-580, p 541.

22 Lezama Lima, 1988, p. 74.

23 Irlemar Chiampi, *Introduction to Lezama Lima, Jose. A Expressão Americana*, São Paulo, Editoria Brasiliense, 1988, p. 20.

24 Ibid., p. 23.

braids and multiplies it”<sup>25</sup> This Sir Baroque is an artist of the “counter conquest”, settled in a landscape that designs and fulfils the culture, embedded in a “poverty that dilates the pleasure of intelligence.”<sup>26</sup> The character, “first authentic installed in what is ours in his grange, canonry or dresser house” appears ordinary and inventive for new languages, creating techniques and expressions as wide as “furniture for the house, ways of life and curiosity, mysticism that holds the new modules for prayer, ways to enjoy and treat the delicacies, which exude a complete life, refined and mysterious, theocratic and brooding, wandering in form and deeply rooted in its essences.”<sup>27</sup>

In many analyses of the baroque as a philosophy of the form, there are numerous references to sound, vibrations, waving movements, resonance, matter and curves.<sup>28</sup> The radio waves, as infrastructure, are infinite, caudal and perennial gravitating in space where one awaits the formulation of landscape. The conjoined phenomena, which speaks – sonic landscape – and also communicates – political landscape – is essentially a techno-aesthetic media.

#### SPECTRUM AND RADIO TECHNOLOGIES

Radio has strong ties to the ordinary. This ‘anti-scriptural’ technology provides an autonomy of language, speech and orality interconnected to its natural infrastructures – the sonic environment, voices and the spectrum – which enables it to be heard in no less ordinary contexts. In contrast to a hi-tech, wealthy universe of communication and the business, which surrounds it, radio appears as a low-tech, poor media, with its emphasis on the common resource and sympathetic connections among its collaborators, elements, which render an aesthetic multiformity and relief, which helps to carve the geo-cultural shape of society.

Projects of privatizing or militarizing the spectrum – an ongoing policy of the State and Telecom Companies – are opposed to this perspective of the space as a common good which fulfills the spirit. Instead of liberating it, they promote a prison within an infrastructure which is controlled, managed and tamed, not to mention the strategic surveillance, capturing of data and symbolic impositions which depend on those institutions only. Every proposed technology, from Google's

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25 Lezama Lima, 1988, p. 81.

26 Ibid.

27 Ibid., p. 80.

28 Cp. Gilles Deleuze, *A Dobra, Liebniz e o barroco*, Campinas, Ed. Papyrus, 1991, p. 227.

project Loon<sup>29</sup>, to Facebook's Aquila project<sup>30</sup> are, despite promoting 'free access' and democratisation of information, convert the natural infrastructure to a monopolised technology which dances according to political interests and the stock market.

Since ancient times, when conceived as *ether* or the *fifth element*, mankind has been fascinated with the natural and technical aspects of electromagnetism. With the development of radio, the electromagnetic sphere has gained an increasing centrality in techno-political processes. Despite this ubiquity, in general, little is known about the disputes involving its management in society and how it can be understood within different contexts.

Throughout the 20th century, the radio became popular all around the world as a passive receiver, even if it was conceived as the first modern technology of P2P (peer-to-peer) wireless communication. This geopolitical paradigm of the first half of the 20<sup>th</sup> century, despite many interesting analyses from the aesthetic point of view, notably Arheim and Brecht<sup>31</sup>, replaced amateur radio diversity with a model that privileged licensing, state monopoly, and large-scale production and broadcast in the form of mass media. In general, this means that it becomes increasingly difficult for ordinary people or small communities to use the spectrum, while, at the same time, gave the state more bargaining power through concessions for broadcasters through the allocation of frequency bands for commercial and ideological purposes. A common and natural resource, the spectrum, then, becomes privatized, conceived as a commodity and a bargain allotted among different actors of political and economic importance.

For a long time this allotment was justified by the need to avoid interference between transmissions. The argument used was "tragedy of commons"<sup>32</sup>: If there weren't allocated frequency bands for each

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29 "Project Loon is a network of balloons travelling on the edge of space, designed to connect people in rural and remote areas, help fill coverage gaps and bring people back online after disasters." See: <https://www.google.co.nz/loon> [accessed May 19, 2016].

30 "a new aircraft architecture [...] that can support staying in the air for months at a time. Aquila is solar powered, and when launched, it will create a 50-km communications radius for up to 90 days, beaming a signal down to the people [...]. This signal will be received by small towers and dishes that will then convert it into a Wi-Fi or LTE network" See: <https://code.facebook.com/posts/993520160679028/building-communications-networks-in-the-stratosphere> [accessed May 19, 2016].

31 Cp. Rudolf Arheim, *Radio: and art and sound*, Michigan, Da Capo Press, 1936 and Bertold Brecht, "The Radio as an Apparatus of Communication", in *Brecht on Theatre*, New York, Hill and Wang, 1964.

32 The tragedy of commons refers to the supposed impossibility of the use of unregulated and shared goods, being the individual self-interest better fit to keep the resources prospering. Cp. William Forster Lloyd, *Two lectures on the checks to population*, Oxford, Oxford University Press, 1833 and Garrett Hardin, "The Tragedy of the Commons", *Science Magazine*, Vol. 162, Issue 3859, 1968, pp. 1243-1248.

operator, communication would become chaotic as the overlapping transmissions would remove the received messages. From this scarcity paradigm, the management and regulation of the spectrum and its telecommunications is basically down to two powerful economic groups: the traditional oligarchies of 20th-century mass media, as well as modern telephony and mobile internet providers. While the first operates under State legislation, the latter operate under a sub-concession mechanism, selling the spectrum to its members.

Today, the management of the spectrum inside national borders is the responsibility of each state while the international decisions are made by the International Telecommunications Union (ITU). This body is the only UN agency to have both public and private sector members: “Founded on the principle of international cooperation between governments and the private sector, ITU is the premier global forum through which parties work towards consensus on a wide range of issues affecting the future direction of the ICT industry.”<sup>33</sup> Every aspect related to the spectrum is discussed from the technical, to the political, and monetary point of view, by the key players of the area. Civil society, in particular minority groups, are virtually absent from those discussions and decisions.<sup>34</sup>

Relegated to the role of consumer or spectator for a long time, civil society's role for an autonomous and independent use of spectrum for telecommunications were not eliminated thanks to initiatives of free and community radios and TVs. However, the proliferation of radio communication devices (cellular networks, WiFi networks, GPS) and the possibilities opened up by the digitisation of TV and radio broadcasts show that this may change.

Several surveys<sup>35</sup> claim that the interference is rather a technological limitation than a natural scarcity. Rather, experiences with “cognitive radios”<sup>36</sup> indicate that the spectrum can be much more abundant, the

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33 ITU, “About ITU”, *Official Website*, 2016. Available at: <http://www.itu.int/en/about/Pages/default.aspx> [accessed May 19, 2016].

34 Cp. Diego J. Vicentin, *A reticula reticulação da banda larga móvel: definindo padrões, informando a rede*, Tese (doutorado em sociologia), Campinas, IFCH/UNICAMP, 2016.

35 Cp. David Reed, “Why Spectrum Is Not Property – The Case For An Entirely New Regime of Wireless Communications Policy”, *Website of David P. Reed and his family*, 2001. Available at: <http://www.reed.com/dpr/locus/OpenSpectrum/OpenSpec.html> [accessed June 22, 2016]; George Gilder, “The new rules of the wireless”, *Forbes Magazine*, 29<sup>th</sup> of March, 1993; Yochai Benkler, “Open Wireless vs. Licensed Spectrum: Evidence from Market Adoption”, *Harvard Journal of Law & Technology*, Vol. 26, N. 1, 2012.

36 “A ‘Cognitive Radio’ is a radio that is able to sense the spectral environment over a wide frequency band and exploit this information to opportunistically provide wireless links that best meet the user communications requirements.” D. Cabric et al., “Implementation issues in spectrum sensing for cognitive radios”, in IEEE (ed.), *Signals*,

more transceivers operate dynamically in different spectrum bands. The cheapening of “software-defined radios” and the dissemination of “spread spectrum”<sup>37</sup> technologies make the task of denaturing the paradigm of spectrum scarcity even more urgent. In cognitive radio, the frequency of the machine is determined by the software and not by the hardware, so that it is computationally possible to choose the best transmission frequency for each occasion. Such perspectives assume the criticism of spectrum scarcity and highlight the concrete benefits of non-licensed use of the spectrum for technological innovation and the democratization of communication increasing the diversity of voices and participation.

### FREE RADIOS, JURUÁ PHONIES – TOWARDS ANOTHER BOND

It is precisely this multiplicity of voices and the principles of (electronic) civil disobedience that guide the actions of many “free radios”, a model of exploring the spectrum on which the voice, “escapes’ from the domination of a sociocultural economy, from the organization of reason, from the grasp of education, from the power of an elite and, finally, from the control of the enlightened consciousness.”<sup>38</sup>

The political approach of unconventional radios was initiated by the French and Italian free radios of the 1970s, uttering a clear position that would separate them either from the capitalist market or from institutional forms of governing. In their own words: “A word finally found. Seemed plausible to invert the official information and make another true to be heard, free from money and power.”<sup>39</sup>

Free radio is about “finding another use [...], a form of making speak minor voices [...], promote a certain type of creation that could not happen in any other place.”<sup>40</sup> An important element to notice, is that, for Guattari, the agent of this process of singularisation is always connected with “marginalities”, “minorities” and “abstract machines” – prostitutes, criminals, primitives, madmen, and children would be examples of “most creative and elaborated abstract machines.”<sup>41</sup> That is the reason for the

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*Systems and Computers. Conference Record of the Thirty-Eight Asilomar Conference*, Vol. 1, 2004, p. 772.

37 Also known as “Frequency hopping spread spectrum” (FHSS); a technique that some radio protocols use to overcome the problems of interference in overcrowded bands.

38 Michel de Certeau, 1984, p. 158.

39 Collectif radios libres populaires, *Les Radio Libre*, Painlevé – Paris V, Petite collection Maspero, 1, 1978. Translated from brazilian portuguese by Novaes, Thiago & Maureau, Raphael. Translated by the authors.; Cp. Coletivo Rádio Livres Populares, *As Rádios Livres*, 2003, p. 8.

40 Félix Guattari, Suely Rolnik, *Micropolíticas. Cartografías del Deseo*, Madrid, Ed. Traficantes de Sueños, 2006, p. 125.

41 Ibid., p. 361.

strong connection of the free radio movement with the anti-asylum movement, sex worker demands, feminist policies, and other new social movements. Free radio would then encounter the claim for decolonisation in the form of identifying those on the margin of hegemonic modes of thinking and behaviour, giving them “voice”, and also, to defy the very norm that allocates them in such a place.

In the Amazon, where the state and the market see one of the last frontiers of civilisation, radio is the prime media. Oral communication defies and supersedes the written word. The population have another mode of thinking about exploring its resources. This results in an experience of radio communication which combines the technical possibilities of digital radio and an epistemological break with the idea that the Internet and the exploration of the spectrum by telecommunication companies willing to provide access, is essential and urgent.

The project “Fonias Jurua” is an ongoing project, a radio network composed of six stations, five of which are installed in the Reserve of Alto Jurua (REAJ/AC) in the Amazon forest area, and one in the urban municipality where the reserve is located. The issue faced by the project was the implementation of an infrastructure of communication and information that integrates the communities of the reserve either internally or externally. The proposed solution consisted of using the shortwave radio associated with a digital data transmission experience.

For the Amazonian territorial conditions, radio has numerous advantages. Because of its use of the spectrum for the transmission of signals, radio does not require optic fiber cable networks, which are expensive, labour-intense and hard to maintain in the context of the forest. The same is true for satellite connections, which, in addition, implies the loss of autonomy and security of communication due to a dependency on foreign providers companies (Brazil does not control its satellites). Also, it is the most popular media in the region, making communication to other networks easy, especially with the six Indigenous territories neighbouring REAJ and cities of its surroundings.

The radio network showed significant advantages regarding its maintenance and continuity of its operation. Firstly, both telephony and satellite internet access is provided by commercial operators; hence the costs for this access can be avoided by using radio. On top of this, the power source for continuous operation of radio stations can be provided by a simple scheme of solar power (photo voltaic). Additionally, the devices that make up the basic set of a station – transceivers, antennas, cables, battery – are generally more robust and durable than computers and mobiles, either in regard to its resistance to detrition caused by

everyday use as well as the logic of planned obsolescence. Finally, although the internet access could be claimed through public policies of access, such as the GESAC program<sup>42</sup>, the political mediation necessary for obtaining and maintaining the relationship with the government also needs to be counted as a technological value and political submission, and an obstacle to popular and traditional culture civil organizations, as it is the case with farmers and rubber tappers within the Amazon forest.

To perform this project, two notebooks and two devices<sup>43</sup> served as a kind of modem that provided the connection from the computers to the radio for the transmission of digital data via an analog signal. In this test, which appears to be the first of its kind, an image file was broadcasted between the city station and a station installed at the mouth of river Breu, about 50km away.

It is a fact that the bit rate that this coupling provides does not permit the transmission of very large files, neither can it be used as a substitute for access to the Internet. However, it presents immense application possibilities in local services and even integration with Internet services. In conversations during testing and workshops, two main fields of application services were raised: distance learning education and geo-processing – the latter being of significance in the field of territorial and environmental management.

We believe that this experiment can problematize the models and technical choices of solutions that have been developed by corporations like Google and Facebook for the provision of Internet access to the so-called “Next Billion” – a category which refers to the huge population of the Global South who are not yet connected to the Internet. On the other hand, if our experiment is successful in its continuation and future developments, it may even point to an alternative national solution based on the use of digital radio to certain portions of the territory.

Overall, this experiment raises a question about the infrastructural gap of information and communication networks (therefore its technical and geopolitical implications) in the Amazon forest and rural areas, the so-called last mile for the global communications network. In the municipality of Marechal Thaumaturgo, Internet access alone is a complicated task that demands a great deal of patience – after all, there are only two commercial providers who deliver an equivalent bandwidth service that one possesses in an average city in the Southeast (10 Mb/s) – our experiment of transmission of digital data by radio, gets us across

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42 Governmental program of free internet access provided by satellite for rural and isolated areas.

43 Signalink™ USB sound card – radio interface.

the last mile.

Furthermore, the scope of the project activities in the current context of the region allows us to question how the network of radio stations can be an instrument for strengthening local cultural practices and territorial and environmental management. Autonomy in relation to technological devices and contents that matter to a group, interweave with a use of the spectrum which is not forced or pre-modelled by interest in access or connection for its own sake. Non-commercial, oral and local infrastructure of communication are, more than ever, a necessity for the organization of the space and of what is produced and shared in this context.

Radio waves are movements of matter and energy. Materialities which, even if invisible, fulfil the landscape and blend natural and human bodies. The capitalist commercial and political power control it by managing the technique behind it and ergo, the aesthetic, symbolic and semantic part of it at the same time that criminalizes its use in a non-capitalistic way. The criticism of this brand of politics needs an analysis that considers either the materiality as the symbolic part of the technopolitical process of the construction of this fundamental infrastructure. The ‘minor’ voices considered here provide another perspective and paradigm for the productive forces and infrastructure of communication contrary to the claims by those who seek to capture the “next billion” with their dominant network.