SUBJECTIVITY, ART, AND SPACE SCIENCE COSMOFAGY AND PERIFUTURISM A SMALL SELF-CARTOGRAPHY

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Translated by Kadija de Paula[2]

My greatest influence in the field of science and technology came from the free software movement in the early 2000s in Brazil, through groups like *Mídia Tática Brasil*, *Submidialogia*, *Digitofagia*, *Metareciclagem*, and *Des).(centro*. These groups, among others, were fundamental in building the "digital culture" and "free culture" programs of Lula's government, which between 2003 and 2011 transformed free software activist agendas into public policies, implemented throughout Brazil by the Ministry of Culture led by Gilberto Gil, who is still widely considered to be the best Minister of Culture the country ever had (BORGES and NOVAES, 2010).

It was an unusual experience to bring to Brazil's government agenda all discussions around hacking, free licenses, open code, radical pedagogies, technomagic, technoshamanism, the satellite-less movement, and so many other things we used in small-scale internet networks and labs, which, in that historic moment at the turn of the 21st century, reached the entire country. This shifted us from a position of activism, resistance, and ideological minority to one of large-scale implementation, disputing ideological perspectives in the political arena.

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This period was very fruitful for experimentation and knowledge exchange because, beyond the political confrontation, we had a vast production of digital technologies, laboratory experiments, alternative energy constructions, biohacker activism, all of which were articulated with various communities from different regions of the country, such as quilombola, indigenous, and riverine communities, as well as many others from social movements, cooperatives, and civil organizations. Each one brought its own common practices into the network, which made the large *Pontos de Cultura* and *Cultura Viva* gatherings intense environments for learning.

During this period, I pursued my postgraduate studies in Clinical Psychology at the *Núcleo de Subjetividade* (PUC/SP 2003 – 2013, with a 3-year break), increasingly being drawn toward a path that intersected art, subjectivity, and technoscience—my three main professional focuses to this day. Navigating these three fields, I proposed several projects, workshops, and experiments (BORGES, 2016; BORGES, 2018; BORGES and FRAGOSO, 2019; BORGES/2020). Engaging with all these technoscientific and technosocial layers gradually deepened my interest in this triad, eventually taking on planetary aspects and finally connecting with space research (BORGES, 2013).

It was at the *Orbitando Satélites* exhibition in 2011, held in Gijón, Asturias, Spain, that I fell in love with the field of space art/culture. The event took place at *Plataforma 0 - LABoral Centro de Arte y Creación Industrial* during a hacking meeting called *SummerLab/2011*. Pedro Soler, curator of both events, invited me to an artist residency at LABoral, where I saw the exhibition. I was enchanted by what I saw, and my perspective on satellite poetics drastically shifted, now seeing satellites as a "living, expansive, and progressive organism." I cite a brief text by Joanna Griffin that captures the spirit of *Orbitando Satélites* well:

"Our work with satellites created an imaginary of associations and connections. At times, this felt overwhelming, and sometimes we had to step away from the machines to reflect on the changes occurring in our thinking. The orbiting satellite is both material and narrative. Its material being, identity, purpose, and ownership can be altered through narrative. Realizing the power of this tautology, that material and narrative are one and the same, reopens the skies to the world's storytellers. The poetics preceding the satellite and those that emerge from it are an unexplored zone of influence" (GRIFFIN/2011).

I mention this quote by Joanna Griffin because it was at *Orbitando* that I first encountered her work, which deeply impressed me with its delicacy and mythical thinking. Joanna, who works at the intersection of space art and science, says that the best way to reconnect humans with space is by creating ways to provoke a personal experience, producing meaning and memory. In one of her works, which I saw through video, Joanna projects the Moon using a digital telescope, enlarging its real-time image onto the ground. The Moon gradually grows in the middle of a dark room where the audience sits. A storyteller begins recounting stories about the Moon, the satellites orbiting it, and its first photos. This sensitization is part of a poetic project aimed at creating less objectivist approaches within space culture, countering the usual forms of utilitarianism and commodification of space. Her work brings a magical dimension to satellites. In the performance video, she recognized each satellite by its name, mission, and originating project, as well as its orbital behavior, transforming the satellites into entities, into mythology. She brought people closer, showing satellite images and telling peculiar stories about them, such as satellites lost in high orbits that "die"—like India's Chandrayaan-1 probe—and how, due to some arbitrary event, like overexposure to the sun, a low-level solar storm, or being hit by asteroid fragments, they sometimes come back to life, emitting signals to Earth again, years later. She delved into these stories by inviting the audience to perform the satellite in question, asking them to mimic its movements: an antenna opening, a noise, an orbit around a Moon projected on the floor. She also elaborated other artistic games, with either informational or fictional data, such as in the picture above, where a participant recounts how they were "trapped on the Moon."

Joanna, at the time of the *Orbitando* exhibition in 2011, was a collaborator at *CEMA* (Centre for Experimental Media Arts) at the Srishti School of Art, Design and Technology in Bangalore. *CEMA* constantly organizes transdisciplinary events, bringing together artists, researchers, and scientists for debates and presentations to articulate relations between art and science and to produce critical and poetic thought. This school is one of India's leading institutions in art and design and a pioneer in space art and science research, where projects like *Moon Vehicle* (GRIFFIN/2012) were developed during the launch of the Chandrayaan-1 probe, launched in October 2008, which lost contact with Earth in August 2009. *Moon Vehicle* is the Sanskrit translation of *Chandrayaan*; for Griffin, the fact that the probe carried an ancient Indian name for a contemporary technological project brought a magical dimension to her artistic work.

Despite being involved in many art and technology networks, including the *Movimento dos Sem Satélites (MSST)* (DUQUE, 2011; STERLING, 2013), during the time of *Orbitando Satélites*, I had not yet fully awakened to the artistic, mythical, and ancestral aspects of it all. I was more focused on ethical and political issues. Although I understood the poetry of the MSST colleagues, I had never seen so much space art in one place, with such a sensitive and memorable profile as I did at *Orbitando Satélites*. This directly impacted my ongoing doctoral thesis. Before the exhibition, I was researching a different subject (autonomous networks in cyberspace), but when I returned from *SummerLab* to London (where I was doing my doctoral internship at *Goldsmiths University of London* in 2011), I began seeking more satlabs, hacklabs, and artistic spaces that articulated space art projects within DIY (Do It Yourself) culture. I ended up changing my research theme to focus specifically on outer space issues, investigating the relationship between culture, the space race, and astropolitics. The final thesis was titled *In Search of Space Culture* (BORGES/2013).

The *MSST* was created in 2005 by Glerm Soares, who wrote the manifesto shortly after the *World Social Forum* in Porto Alegre. The manifesto quickly gained engagement from the *Estúdio Livre* and *MetaReciclagem* networks, as well as the international free software community, including Arduino and Pure Data development networks. The manifesto was translated into several languages, and some international meetings were held, with Brazil as the headquarters. The *MSST* was inspired by one of Brazil's largest social movements, the *Movimento dos Sem Terra (MST)*, which, like other social movements in search of land and shelter, occupies idle, abandoned spaces or those long in debt to the federal government. Some *MST* settlements are now references for food autonomy, agroforestry, radical pedagogy, etc. They seek autonomy using different strategies in each region. The *Movimento dos Sem Satélites* (Satellite-less Movement), in turn, envisions the occupation of outer space, identifying the "lords of the sky," the orbital landowners, and orbital agrarian reform, extending the "right to land" to "orbital rights," to occupy the solar system. It is characterized as yet another of the many utopias of the free software movement. The entire notion of collaboration, free culture, intellectual generosity, and sharing is embedded in this movement. The *MSST* was comprised of individuals involved in free radio, free software, free culture in general, maker culture, DIY, IT technicians, recyclers, scientists, mechatronics experts, and researchers in the humanities, such as anthropologists, psychologists, artists, social scientists, among others.

There have been four international meetings of the *Sem Satélites* so far. At the III *International of the MSST* in June 2013, Luciana Fleischman recorded an interview with Pedro Soler, which I attended (FLEICHMAN, 2013), where we discussed politics and space culture, whether or not to institutionalize the *MSST*, among other topics. This conversation arose after an episode the night before when we had a big discussion with all participants. I and others argued that the *MSST* should send its own satellite or occupy an obsolete satellite to promote our ideas in space. However, this was questioned by several people who argued we shouldn't interfere with this because the *MSST* was a poetic movement, not a space agency, and so on. In this video, filmed by Fleischman, we discussed the idea of creating space agencies to gain some real autonomy in space. We talked about funding systems, ways to make space occupation happen, even if through other groups beyond the *MSST*. From that point, a new saga began for me. That day, I considered that it would be more difficult to implement space projects in a more propositional manner within the *MSST* since this would entail creating a legal institution. The *MSST* wanted something different. I accepted continuing with the *MSST* as a space for creation, affectivity, organicity, reflection, poetry, and critique, but decided to pursue my research and projects with other institutions more actively, as many others were already doing.

After the III *International of the MSST*, Pedro Soler and I managed to get the *Arte en Órbita* exhibition project approved in 2015 at the *CAC - Centro de Arte Contemporânea de Quito*, Ecuador.[3] The exhibition ran from March to June 2015 and, according to all reports, was the largest space culture exhibition in South America at the time of this article's writing (2022). This was the first time I acted as a curator of art and technology, and I was able to bring together works by artists who were part of my doctoral research. I had the pleasure of working with Pedro Soler, an expert in art/technology, from whom I learned a lot about these topics. *Arte en Órbita* was a major exhibition, featuring around 30 artists from various countries in South America, as well as Africa, Asia, Europe, and the Middle East. State, civil, and artistic space agencies participated, bringing the discussion around the theme: *"Space Exploration: From the Ancestral to the Contemporary."*

We walked through the exhibition, which was divided into three related elements: 1) listening, 2) agencies, 3) launch. We addressed fictional, utopian, and dystopian issues related to the dream of space, but we also brought in projects that break away from space colonialism, raising issues related to the Anthropocene, the depletion of mineral resources,

[3] Art in Orbit. CAC. Quito, Ecuador. Fabiane M. Borges and Pedro Soler (curators) https://sacieartscience.wordpress.com/2017/07/03/arte-em-orbita/ (Accessed on 08/22/2024)

biodiversity extinction, questions of gender, race, class, and identity, as well as space policies and laws, and the dominance of large corporations over the most privileged orbits, giving priority and visibility to some smaller initiatives with alternative proposals. What would post-colonial space thinking look like from a Latin American perspective? In his text "Arte en Órbita - Post-colonial Space Exploration at the Equator" (SOLER/2015), Soler discusses each of the three related elements highlighted in the exhibition: listening to Earth, the agents and agencies involved in building a post-colonial space perspective, and the launch of space projects. These three axes were conceived as a pathway through the museum, traversed by the audience.

After the *Arte en Órbita* exhibition, I started a post-doctorate in Visual Arts at *NANO/PPGAV/UFRJ* in 2016, with a *PNPD/CAPES* grant, which allowed me to continue researching space art/culture more consistently and in a more organized manner. I had the opportunity to design the postgraduate courses *Art and Space Culture* (2016) and *Speculative Fiction* (2018), updating this knowledge and generating more demand for academic studies in this area in Brazil.

In 2017, I invited artist Paula Scamparini (UFRJ) to hold a special event on Space Art and Culture at the *Valongo Observatory* in Rio de Janeiro. The *I Comuna Intergaláctica* took place in November 2017.[4] In the call for participation, we addressed Earthlings, psychonauts, zombies, spies, nerds of all kinds, ontologists, metaphysicians, magicians, cyborgs, astronomers, artists, rural and urban indigenous peoples, technoshamans, fiction writers, aliens, and time travelers for an intergalactic meeting at the *Valongo Observatory*!

The *I Comuna Intergaláctica* broke with several issues raised by the previous events mentioned above (such as *Orbitando Satélites* and *Movimento dos Sem Satélites*), as it had a profile more focused on art and astronomy and was less engaged with the free software movement. This shift was due to the new context of globalization, internet governance, the loss of many hackers to corporate power, imprisonment, exile, or suicide, and the weakening of the global free software culture. We created a web radio program with themes on the current stage of space colonization and the research conditions in the "third world." The meeting didn’t follow the format of individual research presentations, but rather the presentation of major themes in which researchers and participants could engage depending on their interests. Topics included constellations, archaeoastronomy, the occupation of Mars, solar Anthropocene, and

[4] See the complete material with all talks and participating artists from the I Comuna Intergaláctica on the SACI-E website. Available at: https://saciesite.wordpress.com/2017/11/16/texto-de-apresentacao-da-comuna-intergalactica/. Acessado em 15/10/2024.

more. The artistic and scientific works were created based on the interaction or response to the meeting's themes. There was a lot of noise, electronic music, projections, videos, indigenous storytelling, installations, performances, live experimentation, jam sessions, percussion, solar observation, antenna construction, and more. Themes of astronomical magnitude were distributed non-linearly or hierarchically, like clusters of constellations where scientists, artists, poets, and philosophers orbited. This allowed for exchanges between their densities, gravities, and worldviews, which were amplified by the suspended architecture of the old *Valongo* observatory, offering a panoramic view over Rio de Janeiro. The conversations, the environment, and the artistic works put us in a subjective condition as Earthlings, inhabitants of planet Earth.

This planetary dimension is not easily accessed, not even through the daily exercise of astrophysics, which often focuses on minute issues and loses sight of the cosmic grandeur. The fact that we were with indigenous peoples, spending the night stargazing with telescopes, conducting rituals, and bringing in transversal discussions between science and imagination placed us in this special state of awareness. This is the point I consider important to reach in proposing these events between art and science—the poetic and imaginative dimension from a set of sophisticated technoscientific structures. I believe this helps us understand a little about the role of the psyche and subjectivity in the field of space culture. It's a technomagical pedagogy. Without a doubt, we brought to the *I Comuna Intergaláctica* a tradition of experiences derived from the free software movement, the networks produced around digital culture, and the experiences from technoshamanism gatherings (BORGES, 2016). It's important to remember that the *Valongo* observatory is located in an area that once witnessed some of the worst scenes of slavery in the country, being one of the main ports where African peoples were enslaved by colonizers in the 16th century. This also became part of the discussion and enhanced our small cosmistic and libertarian ritual.

A few months later, from May 22-27, 2018, we launched *Hiperorgânicos#8* at the *Museu de Astronomia (MAST)*, extending to the *Museu do Amanhã* in Rio de Janeiro.[5] The general theme was *Ancestrofuturismo* (NOBREGA, BORGES, FRAGOSO/2019). It was organized by Maria Luiza Fragoso and Carlos Augusto Nóbrega (coordinators of *NANO - Núcleo de Arte e Novos Organismos / PPGAV/UFRJ*), who invited me to co-organize,

[5] See the complete material of lectures, activities, and artworks from Hiperorgânicos #8 - website: http://www.nano.eba.ufrj.br/hiper8/. Or on the SACI-E blog: https://sacieartscience.wordpress.com/2019/07/16/hiperorganicos-8-ancestorfuturism-mast-museu-do-amanha/ Accessed on: 15/10/2024.

especially the *MAST* portion of the event, which focused on the intersection of art and space science.

The event at *MAST* had a more academic format than the *I Comuna Intergaláctica*. In the first presentations of scientific papers and roundtables, we discussed topics such as: the end of the world; futuristic dystopias; beliefs, bets, and mythical narratives embedded in astronomical science and other sciences; and multiplicity as one of the most virtuous traits of reason. We soon found ourselves discussing a possible *South American Space Program*; various remote sensing techniques used to track deforestation and reforestation in the Amazon rainforest and oceans. Next, we talked about archaeoastronomy, the study of the history of galaxies in ancient cultures, and instinct and animality in art/science. Then we moved into Afrofuturism and the Black diaspora through science fiction cinema; we heard about the body marks of the Kaigang indigenous people, which serve as the foundation of their social organization and resistance against the colonial project. We also listened to the Pareci indigenous people talk about life before white colonization, the Tupinambá indigenous people speak about the Sky of their ancestors, and the Pitaguary indigenous people discuss how Earth mining for them also means spirit mining. They presented their proposals for defending indigenous territories, their demarcation, and resistance through various video formats, fulldome, virtual reality, and augmented reality as ways to bring more impact to the presentation of these issues. We heard from artists about the avatar body that can lead us to the metaphysical powers of technique; the experimental and poetic dimension of space technologies and satellites; antenna, spectrum, and radiofrequency research. We then observed how sound waves influence matter (cymatics); science as a powerful tool to invent the future and the role of science fiction in this process; followed by sonic mapping using radio, and the fictions, rites, and fetishes of the queer universe in relation to falling, which uses gravity as a source of experimentation and transcendence of bodies and ideas. We discussed the knowledge production methods of traditional peoples through ritual objects such as masks made from tree bark and their relationship with solstices, equinoxes, eclipses, and the pendular trajectory of the sky. We spoke about the history of constellations and the light pollution that prevents direct contact with the sky as people had in the past: there are already two or three generations who have never seen a natural sky. Finally, we moved on to discussions about accelerationism, the reinvention of capitalist technologies, and the role of art/science in enlivening past stories and inventing new ones.

The art installations, performances, projections, and happenings accompanied the debates, adding an aesthetic dimension to the meeting. There was sound, noise, artificial intelligence, robots reciting *Plato's Republic* and *Davi Kopenawa's Fall of the Sky*, video mapping illuminating the chants of contemporary medieval witches, video projection, solar and lunar observation, poetry sessions, storytelling about the sky, a black hole performance, an interactive table installation with satellite data, transforming personal images into beings from other planets, and more.

Although the event had a more academic structure, we were able to access the fabric of technoshamanism, which was amplified by the architectural structure of *MAST*. Like the *Valongo Observatory*, *MAST* also offers a panoramic view of Rio de Janeiro, with its gardens, telescopes, and observatories that inspire awe and emotion, leading us to this state of awareness, grandeur, and the speed of cosmic thinking, evoking a sense of understanding of our planetary and terrestrial condition. Addressing these issues not just technically but by combining technoscience with imagination is a form of ritual, a renewal of memory and expansion of desire. From this perspective, we can qualify these encounters as clinical processes, as they relate to healing imagination and enhancing subjectivity—not just to mysticism, esotericism, or religion, as Americans tend to label this type of hybrid thinking (STERLING, 2013).

Following this cosmic abundance, despite the precariousness of our bodies, intellects, and funding systems, we launched the *II Comuna Intergaláctica* a few months later, in September 2018, during the *Spring Equinox* week.[6] It took place at the *Municipal School of Astronomy (EMA)* and the *Aristóteles Orsini Planetarium* in *Ibirapuera Park*, São Paulo. It was a nine-day festival, with Eduardo Duwe and I as the general organizers and curators; Marcia Reverdosa and Yasmin de Araújo as the executive producers; and Rafael Frazão as the visual communication designer and curator of science fiction films. We collaborated with the planetarium coordinators, Fernando Nascimento, Otávio Dias, and the astronomer João Fonseca, among other EMA and planetarium staff members. The selection of works was made through a public call and invitations to specific groups whose research was directly related to the festival's themes. We launched topics based on some key points of space projects that were happening in 2018, such as the *Tesla* car launch in heliocentric orbit, identifying this action as a new paradigm of the space race, the mediaization of the solar system. We also brought in researchers involved in asteroid mining, who showed us projects being developed by

[6] See the complete material of lectures, activities, and artworks from the II Intergalactic Commune: https://sacieartscience.wordpress.com/2019/07/15/comuna-intergalactica-ii/. Accessed on: 10/10/2024.

corporations and multinationals in search of special minerals contained in asteroids as well as on the lunar and Martian surfaces. From there, we moved on to the issue of space tourism, which we identified as the next big tourism trend in the coming decades; we debated whether distant planetary travel would be done in person or if robots would do the work while humans followed along through 3D glasses. We questioned whether the project of sending humans to Mars is a utopia or if it holds much more ambitious projects than those revealed by the space company media. We updated the old and forgotten *South American Space Agency* project, which had not yet materialized for us in Brazil—seemingly because Brazil has been inefficient. We had dozens of space scientists, astronomers, astrophysicists, feminists, fiction writers, and Afrofuturists at the gathering. We heard talks on transgender issues in the scientific community and how institutional scientific racism works. We brought the *Guarani* indigenous people from the *Jaraguá village* in São Paulo to lead the *Equinox* ritual, while *Caraí Guarani*, a master in astronomy, spoke about celestial luminaries. We talked with the *Garatea* team, who research extremophiles in asteroids, and the *Asgardia* team about space condominium architecture projects and the new wave of cosmetics production using materials from meteorites. We invited a researcher from the team that won the Nobel Prize for measuring gravitational waves to talk about their research. There were meteorite hunters who brought many different meteorites to display to the public. There were debates on Russian cosmism and Italian futurism. We had *Benedito Cunha Carvalho* speaking about the current situation of Quilombola Communities around the *Alcântara Launch Center*, who was captivated by the Afrofuturists. There was science fiction cinema, speculative fiction labs, spectroscopy, electromagnetic field studies, radio astronomy, and space travel through hypnosis. Plenty of performances, dance, interventions, installations, the launch of the *A.E.I.O.U. Agency* (*Agência de Emprego Intergalático Ontológico Único*), many artistic projections in fulldome at the planetarium, created by artists who brought marvelous audiovisual narratives about the sky. There was even live theater in fulldome. The discussion was intergalactic, but also about planetary citizenship, or at least planetary networks instead of nations. Finally, the discussion about communes, types of communes, and commune models was intense, and we also launched the *Terracosmist Manifesto*.

TERRACOSMIST MANIFESTO[7]

Intergalactic Commune II
Spring Equinox 09/22/2018

I

We Terrans, we inhabit a spaceship in full travel through the universe, spinning around the Sun, which in turn performs the same movement around other stars, in a complex system of sidereal connections: our experience of the world is a journey through space, as well as throughout time, and we can never renounce this condition

II

We seek the ancestry of the Earth, reiterating an understanding that we are formed by the dust of stars whose existences exceed us. We bring in our genetic heritage the infinite galactic interactions and, orbiting through gravity, we are at the same time, terrans and cosmists.

III

We want to achieve the terracosmistic singularity. We trust in the multiplicity which science and technology are capable of producing, without univocity. We will not be individuals attached to a single corporation, but embodied in the diversity of multiple galaxies. We will be honest regarding all forms of life and close to our potential of interaction and creation of new worlds.

IV

We like the experience of nomadism throughout communes, as collectives of symbiotic mutualism, as interdependent networks of protection. We believe that no one is forced to live or die together, but we do believe in our ability to coexist with others. We do not sustain totalitarian states, nor imposed gods, thus we will always live as anarcommunals.

V

We are cryptoparanoids with technologies that emulate divinity in the image and likeness of the fascist sapiens, imitating above all three maximal divine characteristics: omnipresence, omnipotence and omniscience. We aim to engage with artificial intelligences (AIs) linked to pantheistic forms of knowledge, to interespecific values, committed to permanent freedom. We therefore deny the scitech formation of a spatio-temporal continuum which would reinforce slavery and thought control.

VI

We reject the overspeed of acceleration, preventing the experience of diverse temporal perceptions. We want to be lords of the passing of our own time, living

[7] *Creators of the Manifesto: Priscila Lima, Pitter Rocha, Christian Zahn, Rafael Frazão, Jessica Macedo, Hernani Diamantas, Rubens Velloso, Lino Divas,Fabiane M. Borges e Leno Veras. The manifesto was created from the proposal of a speculative fiction workshop organized by Fabiane M. Borges and Leno Veras in the II Intergalactic Commune held on the day of the spring equinox at the Ibirapuera Planetarium – São Paulo / 09/2018.* Translation to english: Artur Matuck. https://sacieartscience.wordpress.com/2019/07/20/a-manifest-for-terracosmismo/ (Accessed on: 15/10/2024)

with the tranquility of those who conceive their existence in utmost complexity. Decelerationists, we fight for the end of the scarcity of time and, thus, we will expand to be able to go further.

VII

As animistic panspermians, we experience not only matter in motion but also vibrating and communicating dimensions of subjectivity – which accounts for everything that exists. We rely on extremophyliac language, on discourses which could resist the turbulence of annihilation. Universes beyond, we will strive to conceive exuberant interacting planets as Earth once was, yet admiring the survivors of worlds which are now ending.

VIII

Meteors, expelled from stellar explosions, out of the fusion of internal and external forces, are expelled and released into the void. When they reach and collide with planet Earth those celestial bodies merge with terrean elements producing previously non-existent substances, or their impact accelerate and impress other materials, such as diamonds. We, like all other beings in this multiverse, are the unforesseable result of multiple interactions between cosmunnal energies. We are just like decentered meteors, travelling through gravitational time, occassionally reaching physicalities, eventually causing substances to change, compressing time into other dimensions, we are impactites.

The II Intergalactic Commune was the largest Space Arts and Sciences festival we have held in Brazil to date. More than one hundred artists, scientists, space engineers, astrophysicists, and visual artists were involved. The large São Paulo audience attended the fulldome presentations at the planetarium. My father suddenly passed away during the event's production, which left me deeply shocked, in mourning, and sad, but the planetarium's name – ORSINI - was also his name, and for me, the festival served as a great tribute to my father. We published a magazine on the themes discussed at the gathering: Extremøphilia (DasQuestões / BORGES, 2018), which is undoubtedly a reference dossier on Space Art and Culture, as it brings texts from thinkers in the field from various countries. The magazine's topics revolved around issues such as: exobiology, Space Law and Policy, Interplanetary Communes, Ancestrofuturism, Speculative Fiction, Disruptive Space Science and Technology, and Questioning Art.

By now, readers must have realized that we have a cosmic ambition that works like cosmic background radiation (in microwaves), driving us to carry out these types of festivals. Our mission is to renew the space imagination, including Earth and the diversity of its perspectives. We want to collaborate in generating an ancestrofuturist and technoshamanist mindset, propelling our thinking toward a new place, not dominated solely by bureaucrats and

technocrats, but by people capable of understanding the magnitude of our responsibility towards our planet and the cosmic systems of which it is a part. People who understand our journey through the universe, the speeds and forces we experience daily as time and space travelers. Thus, we also contest the technoscientific imagination, which should serve to refine our desire to promote actions directed toward the cosmos, not to petrify us in capitalist commodities. Earth and Cosmos, without paradox, only combination and continuation, and the desire for bio-expansion.

In 2018, during the events mentioned so far, I carried out my first project with INPE/Brazil (National Institute for Space Research). I wanted to join INPE because it is the reference institution for space research in the country, and I wanted to deepen my knowledge of these studies. Since the first time I went to INPE, in 2013, I dreamed of creating there a center for the study of space art and culture. However, it was only in 2018, five years after a series of meetings with researchers and professors from various departments and sectors, that I was invited to undertake an immersion at the institute. I spent a month at INPE mapping these research centers and departments, raising demands, understanding the institute's challenges and needs, and building partnerships. During this one-month immersive residency in 2018, I realized that INPE scientists are very proud of the institute because it is a machine for scientific production, publishing hundreds of qualified papers every year, participating in national and international space science projects, and collaborative works with dozens of programs around the world. But on the other hand, I also encountered a kind of institutional pessimism in the face of economic underinvestment, the ongoing retaliation against its technological growth projects (not only through national but also international politics), the lack of new personnel in various research sectors, the absence of public recruitment for space science for nearly decades by 2018, and the excessive bureaucracy, which generates near paralysis in innovation production, as projects get bogged down in hierarchical intricacies and lack the autonomy to progress. Moreover, I noted the growing fear of possible privatization of several INPE sectors, the dismantling of scientific research centers, and the evident lack of social support. These concerns echoed in almost all the scientists I interviewed.

With this diagnosis, I negotiated with various sectors to introduce a space art and culture program at the institute, knowing that, given the precarious state of science and technology in the country and the abundance of needs and demands for investment in each specific sector of the institute, it seemed that not only was space art and culture not a priority, but also a little-known topic within INPE. However, I found a receptive audience among some

researchers who recognized the importance of the subject and opened up space for dialogue. We argued that space art should not be seen as an eccentricity within INPE but as a generator of social engagement and agency. As an example, I brought references to NASA's collaborations with the art and culture sectors, as well as with the media and advertising, in which NASA has consistently invested since 1962 under James Webb's direction. This explains why we still live under NASA's cosmology today, while INPE does not engage socially, even within its own country (BORGES, 2024).

In the first two weeks of the immersive residency, I focused on space climate and astrophysics. I visited researchers' offices, laboratories, and spoke with technicians and scientists. I explored testing areas, prototype projects, and telescopes such as BINGO. We discussed their research, I shared mine, and we debated politics, INPE's history, its relationship with governments since its founding in 1961, its connection with the military, scientific publications, funding cuts, and hierarchies within and outside the institute. We also discussed the Alcântara launch site, the situation of the quilombos in Alcântara and their relationship, the precariousness of space programs in Latin America and Africa, as well as the developed world's disinterest in advancing these programs. We delved into more specialized topics such as telescopes in Brazil, radio astronomy research, star formation, stellar nurseries, planetary habitability, cosmology, cosmic microwave background radiation, astrobiology, general relativity, advanced mathematics, black holes, neutron stars, the history of the universe, instruments for detecting gravitational waves, the production of damping springs to create the world's most stable mirrors, thermal control, interferometers, liquid nitrogen cooling, and more.

After two weeks focusing on space and astrophysics research, I turned my attention to environmental biochemistry labs. These places conduct numerous procedures, including measuring atmospheric gas emissions and greenhouse gases in the ozone layer. I was introduced to researchers working on ocean-atmosphere interaction data in the Atlantic and Antarctica, as well as ultraviolet radiation measurements and river and lake water analysis. I followed some field research results in the Amazon Rainforest, such as burn measurements and the soil-air-forest relationship. I visited the air collection lab, which collects samples from biomes like the Caatinga, Cerrado, Pantanal, and Atlantic Forest. I understood the extremely polluting effects of underground peat fires, a phenomenon known as "peat fire," which spreads beneath the surface during forest fires. I also learned about some pre-Antarctic training projects, offering psychologists to prepare technicians and researchers for extreme situations.

I followed the construction of satellites, such as the CBERS projects (a Brazil-China satellite partnership), the SSR Program, and Amazônia 1, a Brazilian satellite for Amazon monitoring, which directs its cameras in different directions and has orbital control. I also learned about the nanotechnology department creating cubesats. I saw numerous studies related to renewable energy, such as solar and wind energy, as well as thermal sensor tests, thermal radars, image generation and processing, satellite data transmission and reception, photointerpretation, and many other activities.

In short, there were many interesting studies. I mention this to give readers a glimpse of the range of topics addressed in INPE's research and to clarify that a space science institute operates with varying magnitudes, going beyond the more common objectives pointed out by mainstream media (Most of the time they only talk about meteorology).

I wanted to spend much more time getting to know the various sectors and creating ways to interact with them and among them. It was shocking to realize that the departments didn't communicate much, that there was no effective communication policy between them, making it difficult to have a broad vision of the institute's overall functioning, which is not concentrated only in São José dos Campos, São Paulo, but in several Brazilian states. For this to be more effective, it would be necessary to completely overhaul the communication sector, both internally and externally, and promote broad public access to the national and international community. This would make it easier for the public to learn about what INPE produces and would broaden the perspective on its national role, making people stop referring only to NASA when discussing space. In this way, INPE itself would benefit from establishing a social support network.

My entry process at INPE was long, uncertain, and extremely bureaucratic. I persisted because the topic is captivating, but in this difficulty, I recognized how hard it is to truly foster an encounter between contemporary art and hard science. Some scientists are more radical than others in this regard - if it isn't pure science, it's nonsense; others are more competitive - artists are fine as long as they follow orders. Yet some are genuinely eager to integrate arts and humanities into their applied research, considering it growth rather than a waste of time.

It was only a year and a half after my first immersive residency at INPE, with the SACI-E project (Subjectivity, Art, and Space Sciences) in hand, that I caught the interest of, at the time, the coordinator of the postgraduate program in space engineering and technology, Walter Abrahão dos Santos, who became deeply interested in artists, contemporary art, art-

science-technology, and subjectivity studies. He contributed many wonderful ideas to our project, such as promoting our participation in the Brazilian Satellite Olympics (MCTI/2021).[8] As a researcher in Space Engineering, I was able to put into practice space art and culture activities, such as bringing art closer to satellites. However, at the end of the two years of work, INPE opened a call for a research scholarship PCI/CNPQ, under the Coordination of Teaching, Research, and Extension (COEPE) and the Division of Extension and Training (DIEX) within the INPE and Society program, where my SACI-E project was approved, under the supervision of Paulo Escada from INPE's Communication Department. The scholarship focused on space art and culture and knowledge dissemination.

I make this bureaucratic digression to highlight that this scholarship represented a rare opportunity for Brazil to become a world reference in space art studies, as very few space agencies develop specific programs in this area institutionally. Normally, artistic sectors interested in the space theme look for specific departments within research institutes, or vice versa (such as Ars Electronica's relationship with ESA or ESO).

Between 2019-2022, I created four main actions for SACI-E at INPE: 1) artistic residencies; 2) ArtSat workshops (with satellite engineer Lázaro Camargo); 3) launch of an album of Latin American space sound compositions (with artist Pitter Rocha); 4) an ArtSat category in the CubeDesign nanosatellite competition (along with postgraduate researchers from PGETE/INPE); and 5) an astropolitics course entitled *"Plutocracy on Pluto", with the support of Diversitas/FFLCH/USP. These four actions brought together hundreds of people from various fields of knowledge over three years, including philosophy, visual arts, design, electrical engineering, marine biology, architecture, cinema, advanced mathematics, astrophysics, history, and computer science. The project received dozens of collaborations from Latin America and other countries in Europe, with guest lectures, jury participation, and the presentation of established works, among other contributions. Now I ask you, why did it end? Because, as I said before, some scientists are more radical in this regard—if it isn't pure science, it's nonsense; others more competitive—as long as artists obey, everything is fine. But some are genuinely eager to integrate the arts and humanities into their applied research, considering it growth rather than a waste of time. However, this last group lost the infamous battle this time,

[8]Space Art at the Brazilian Satellite Olympics – MCTI – 2021. Available at: https://sacieartscience.wordpress.com/2020/10/15/a-arte-espacial-entra-para-a-olimpiada-brasileira-de-satelites/. Accessed on: Oct. 15, 2024.

and I grew tired of staying in INPE's political arena, so I moved on to do other interesting things (BORGES, 2022).

CONCLUSION

What impresses me most about space sciences is the ease of zooming in and out on planet Earth. This back-and-forth produces a velocity that sometimes hovers over Earth's surface (or its depths), sometimes takes its exteriority and flies to specific points in the cosmos. We easily move from the minimum to the maximum magnitudes, from highly specific earthly issues to cosmic dimensions on scales impossible for the human mind to comprehend. Thus, we connect studies like the devastation of the Russian forest and the resulting drought in Europe; the drought in the Amazon Rainforest and the flooding of the Sahara Desert; we make mathematical calculations about gravitational waves, the end of fossil fuels, and overcoming nuclear energy; we understand the interference of solar storms in our communication systems; we create layers of understanding about the relationships between atmospheric pollution, the ozone layer hole, cell phone factories, asteroid mining, and the preservation of indigenous lands remotely monitored. From Earth's specific issues, we move to the grandeur of the cosmos, in a dizzying back-and-forth whose speed opens paths for a variety of imaginaries, which, after all, are crucial for the production of the future. Fiction has always operated parallel to science, sometimes promoting certain theories, sometimes preceding them, inaugurating a new field of research.

We recognize that art/science as a category can only exist in reciprocal relations between different fields of knowledge. It thrives on transdisciplinarity. It is capable of producing its own language and sophisticated ideas as long as it is through hybrid systems, and for this reason, it demands access to and development of technoscientific research. It is necessary because it fertilizes the imagination, which today is devastated, just like nature, and mined to the last root, hijacked like our subjectivity. It is necessary to fictionalize both below and above scientific and technological data to build other future projects and unblock the alternative paths of diversity, otherwise, we are stuck with only one path for producing knowledge. We should not leave the future or end-of-world imaginaries in the hands of

billionaires. This is how I can perceive, from where I stand, the relationship between Subjectivity, Art, and Space Sciences. It is hard work, but it is an extraordinary exercise.

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