



Accessibility to Space Infrastructures and Outer Space: Anthropological Insights from Europe's Spaceport

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COMMONS IN SPACE
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ABSTRACT

With the growing influence of the realm of outer space, there is an increasing need to engage in discussions regarding potential governance structures to address ethical, legal, and political questions that arise. Among the considerations is the concept of outer space as global commons, although no consensus has been reached on an international level regarding its implementation. This paper offers a novel perspective by examining the intricate relationship between Earth-based space infrastructures and how their governance can potentially hinder the realization of utopian visions of space exploration for the benefit of all humanity. Through an ethnographic exploration of Europe's Spaceport, this research brings to the forefront the complex interplay of Earthly politics, colonial legacies, and space governance. It challenges the assumption that outer space can be treated in isolation from Earth space and, instead, highlights the different temporal and spatial scales on which Earthly implications resonate throughout the exploration of outer space.

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INTRODUCTION

The sphere of influence of outer space technologies is expanding. 2022 alone saw a record-breaking number of space launches (Witze, 2023), which is set to be broken again in 2023. This increase in activity comes with a growth in investment, both from national as well as commercial actors, and reflects and anticipates a rise in reliance that people and industries have on space-enabled technologies, including but not limited to telecommunications, navigation, and earth observations. Whereas many of these technologies are enabled through satellites circling in Earth's orbits, there is also a push from multiple directions to further expand human's technoscientific reaches into the universe. Several nations have attempted, with varying success, to make their way to the Moon with robotic missions in the past years. Notable examples are India's Chandrayaan-3 lander which is the first to have landed on the South Pole of the lunar surface, and China's Yutu-2 landed on the far side of the Moon in 2019. These robotic missions are meant to precede endeavors taking people back to the Moon. The Artemis Missions, driven by NASA and granted support by several other major and minor space players, aims to "place boots on the moon" in the next years, to then continue 'from Moon to Mars' through its Gateway program (NASA, 2023a). On the other side of the Pacific, China is crafting a similar plan: their International Lunar Research Project has thus far attracted support from Russia, Pakistan, United Arab Emirates, and the Asia-Pacific Space Cooperation Organization (Jones, 2023).

However, there are questions if the current legal structure is ready to deal with this impetus in space activities. The most commonly relied-on treaty up to date, the Outer Space Treaty (OST) dates from 1967, is party by 114 nations, and sets global principles for the exploration of outer space (UN, 2023). However, it provides very little universally agreed-upon binding legislation and the OST does not explicitly address issues regarding space debris, property in space, mining in space, and other commercial activities (Rabitz, 2023).

Thus, there is a need to explore appropriate forms of governance that can be translated into the realm of Earth's orbit and beyond to address the growing legal and ethical concerns (Tepper, 2019b; Wiser & Aganaba, 2023; X. S. Yap & Truffer, 2022). A significant and recurring idea within this debate is who should drive the creation of government structure, and that debate partially hinges on whether outer space is, could, or should be considered a global common. Global commons "are resource domains to which all nations have legal access (Buck, 1998, p. 6). Usually, the high seas and the seabed, Antarctica, the atmosphere

(including the ozone layer and the climate system), and outer space are all considered global commons (Garcia, 2021). Yet, there is contention over the latter as only some experts consider space a global commons (Nordman, 2021). Legal scholars argue that the Outer Space Treaty does not actually support this claim (Hertzfeld et al., 2015) and the US government has explicitly come out to say that they do not consider it as such (Goehring, 2021).

This paper contributes a unique perspective to the debate by drawing on insights from ethnographic research conducted in Kourou, French Guiana. This article argues that questions surrounding space governance need to include a critical examination of what "outer space" means and for whom, and how that shapes the ways that approaches to its governance are conceived. Primarily, I argue that outer space activities are already deeply intertwined with existing governance and power dynamics on Earth. These aspects must be considered when discussing potential future governance structures. The author provides insights from ethnographic fieldwork in Kourou, home to the launch site of the French and European Space Agencies (CNES and ESA respectively). This work details the complexity of Earth-based space infrastructures and their embeddedness in colonial legacies which have created a particular path forward for space activities through an exclusion of other ways of inhabiting the world. By tracing French Guiana's history from penal colony to launch site in the span of a few decades, the paper shows that separating Earth governance from space governance is impossible and that to take questions of a "sustainable and equal" future in space seriously, examining terrestrial factors is as important as considering celestial ones.

In the first section, the paper addresses the growing literature within the social sciences of outer space. By illuminating work within this subdiscipline, I argue that an increase in looking at how outer space is understood, created, and formed by actors on Earth, can contribute to identifying important opportunities and pitfalls when addressing governance beyond Earth. The second section introduces the ways in which space exploration repeatedly comes with a contest over land. The third section introduces a case study of Centre Spatial Guyanais, Europe's Spaceport, as an illustrative example of where historical and political power dynamics influence the current management of space accessibility. Through ethnographic research, archival analysis, and informal interviews in French Guiana, the entanglements between commoning, neo-colonialism, and access to outer space come to the fore. The discussion examines how these Earth-based examples can contribute to understanding the complexities of governing outer space from Earth-space.

SOCIAL SCIENCES OF OUTER SPACE

This article stems from fieldwork conducted as part of the ARIES (Anthropological Research into Imaginations and Explorations of Outer Space) project. Our team explores the global conception and engagement with outer space, comprising of researchers in Boca Chica (United States), Kiruna (Sweden), Tokyo (Japan), and Kourou (French Guiana), the latter where the author is based. This paper draws upon six months of ethnographic research, including archival investigations at the Centre Spatial Guyanais (CSG), participant observation during numerous outer space-related events and rocket launches, and informal interviews with stakeholders located at or near the launch site.

The project aligns with a broader trend in the social sciences that has seen a growing interest in outer space research. These studies manifest in diverse forms, ranging from the examination of how outer space scientists interact with remote research sites (Messerli, 2016; Vertesi, 2020) to inquiries into bodily experiences in microgravity (Parkhurst & Jeevendrampillai, 2020) and investigations into the fundamental ideological frameworks of space exploration (Olson, 2018; Valentine, 2012). Within this latter body of literature, there's a distinct emphasis on the prevalent colonial discourse found in narratives related to space exploration, as well as the actions of influential entities such as SpaceX, NASA, and asteroid mining companies (Maile, 2009; Smiles, 2020; Trevino, 2020). Similarly, numerous scholars are focused on bridging the gap between space discourse and terrestrial power dynamics, highlighting the frequent transference of Earthly power dynamics to the realms of outer space. Gorman (2005) contends that “on Earth, space places are located within existing cultural landscapes that demonstrate the continuity of space exploration with terrestrial colonial enterprises” (p. 104). Access to outer space is facilitated by a range of technological resources, and notably, for the purposes of this research, infrastructures located on Earth, which are oftentimes placed in locations that are constructed as the “periphery” by those making decisions and geographically removed from political centers (Klinger, 2017).

One way to contribute to the discussion on space governance is by asking questions regarding these current space infrastructures, which can be found right here on Earth. According to Vogler (2012) “For many observers, the defining characteristic of commons relates to the question of access” (p.61). By asking who has access to outer space, what grounds that access is based on, and who holds the power to make decisions regarding space accessibility, unequal power dynamics come to the fore which might undermine the idea of outer space as a global common.

CONTEST OVER LAND AND SPACE

The Outer Space Treaty posits that “the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind” (UNOOSA, 1967). Key issues in this treaty are what counts as “outer space” or as “benefit and in the interests” are ill or not defined within the framework of the treaty. This has created tension in how to achieve these principles practically. Aganaba and Wiser (2023) outline five policy debates that hinge on these uncertainties. Here I will take their first example, Mega-constellations vs. maintaining a pristine night sky, to argue that discussions on outer space as a global common where benefits are shared are inherently entangled in Earthly politics and priorities as priorities of the usage of the night sky substantially differ between stakeholders.

Just to paint the picture, the number of satellites has significantly increased in the last decade, with now approximately to 8,800 functioning satellites orbiting the Earth (ESOC, 2023). A primary issue is that these satellites emit light (Cui & Xu, 2022) and thereby interfere with several forms of astronomical practices (Venkatesan et al., 2020). Not only Indigenous cultural practices in Australia and elsewhere are at risk (Venkatesan et al., 2019), but amateur astronomy globally suffers from the light pollution emitted from the satellites (Kyba et al., 2023). The United Nations has turned its gaze upwards and has been organizing two conferences titled “Dark and Quiet Skies II for Science and Society” to highlight the significance of dark skies and create recommendations to minimize the impact of the satellite industry. This illustrates the tension between access to the night sky from the ground and access to outer space for satellites. With the current state of technologies, there is an inherent trade-off between these two rights, and how to include that in governance will continue to be a point of contention (Finnegan, 2022).

Besides questions of what outer space should be used for, there is increasing attention to the entanglements between space exploration and injustices and inequalities on Earth. Particularly, the case of the Thirty Meter Telescope project on Mauna Kea has attracted substantial academic and public attention (Miner Murray, 2019; Molera, 2022; Mosely, 2022). This is a large-scale project, driven by a consortium of several universities and research institutes from six powerful space-faring nations (Canada, United States, India, Japan, and China) (TMT, 2023). Indigenous Hawaiians strongly oppose the project, as Mauna Kea is a sacred and important site for spiritual practices. The placement of the telescope would interfere with their relation to the mountain, and for many signifies the prioritization of global projects over local needs in a lingering postcolonial state.

Even though the demonstrations have often been put as a case of science versus religion, Kahanamoku (2019) argues that it is about “who gets to make the decisions for people, for land, for the future”. Casumbal-Salazar (2017) further emphasizes this by asserting that the scientific project of the telescope is just a way for political actors to maintain control over the land that has been contested for centuries and Milligan (2023) puts that “At the heart of the dispute over additional telescope placement [in Mauna Kea] is an argument about power structures, priorities, and whose conception of the sacred and of heritage should matter most, rather than any manner of opposition to science per se” (p.3). The debate is not so much about the purpose of the telescope, nor of the trade-off between diverse ways of knowing; rather, it is about property and land rights and how these are entangled in the space industry through a continuation of colonial patterns. The case shows that the activities related to the exploration of outer space impede the usage of land by local communities. When considering outer space as a potential global commons, looking at these existing underlying power dynamics and how ‘modern science’ is used to justify land occupation is important to understand the entanglements of Earth governance and space governance.

“Outer space” as a concept itself is heavily contested and who gets to define it, reiterates particular political, and colonial power dynamics. However, a clear definition is a pivotal aspect in the debate around creating transparent and implementable legislation for its management.

For ease of use, it is often the Karmán line, an arbitrary boundary at 100km altitude above sea level, which is used as an imagined division between airspace and outer space. However, this boundary is not universally adopted and is not mentioned in the existing Treaties on the exploration of space. Spiritual, Indigenous, and religious interpretations of outer space challenge the notion that it is a void or an empty space ripe for resource exploitation. Instead, these interpretations illustrate that outer space is seen as an integral part of life worlds (Bawaka Country et al., 2020; Smiles, 2020; Young, 1987). Who gets to define what “outer space” means, can impact the way in which the benefits, resources, and possibilities are conceived (J. M. Klinger, 2019). In particular, Beery (2016) focuses on the scalar politics of outer space, where a global narrative justifies actions on a local scale. He argues that the concept of “outer space” is elusive, and its definitions are entangled with geopolitical dynamics, often serving the interests of dominant space powers.

The delineation between air space and outer space remains unclear. A single framework to account for all activities beyond Earth is not feasible nor realistic (Nordman, 2021), yet a distinction will ultimately have to be made in order to allow for governance of these spaces. I call that

within that process, Earth-based space infrastructures and their relation to these different parts of outer space need to be taken into the conversation. They can serve as an entry-point both practically and theoretically to understand the applicability of global commons, and other governance, regimes in outer space. As in contrast to “outer space”, Earth-based space infrastructures that allow entrance into outer space, fall under national territory. Physical access, either human or technological, is impossible without the necessary ground-based infrastructures and resources: launch sites, tracking stations, and all equipment and personnel to work on those, all of which heavily rely on the reciprocal relation between political and financial power and socio-technological resources and infrastructures (Dalakoglou, 2016). To tease out how these Earth-based infrastructures complicate the promise of space as a global common, or where exploration and use is for the benefit of all, I draw on fieldwork done in and around Europe’s spaceport in French Guiana.

INSIGHTS FROM THE FIELD

In December 2022 I embarked to Kourou to start my fieldwork. The decision to go to French Guiana was mainly informed by Peter Redfield’s *Space in the Tropics* (2000), an ethnographic exploration of Europe’s spaceport. His research traces the trajectory of French Guiana, a former colony turned into an overseas department, from a penal colony to space facilities in the span of two decades. My work aims to continue this exploration and focuses on the impact of the launch base on those living in its shadows.

Kourou houses the Centre Spatial Guyanais (CSG), the launch complex for the European Space Agency (ESA) and the French Space Agency (CNES). It is a key infrastructure for the European space sector, as it is the only site on European territory that currently has launching capabilities. There are several alternatives being developed in continental Europe, but those are all constructed as additions and not a replacement for CSG (Foust, 2023). At CSG, there are currently two types of launchers used which are both of European make: the Ariane rocket and the Vega rocket. Whereas China, India and the US all saw a rise in rocket launches in the past years, ESA is in what its director has proclaimed a ‘launcher crisis’ (Aschbacher, 2023). Europe wants to keep and further develop its independent access to outer space, as currently, they are heavily reliant on launchers from other nations. Their desire is emphasized in political discourse, with the same director indicating a strategic focus on “independence, sovereignty, and security” for the coming years (ESA, 2022). The Europeaness of the infrastructure is also continually emphasized at the launch

site itself. When you enter the facilities, visitors are first met by a billboard saying, “Welcome to Europe’s spaceport”, to then be greeted by a globe surrounded by the flags of ESA’s member and participating states.

But how did Europe’s spaceport wind up 7000 kilometers away from the continent? While the Soviets and the USA were dividing up a lot of the “firsts” in the sociotechnical exploration of outer space, Europe tried to keep up. France was a leading nation in the matter and was experimenting with sounding rockets from their launch site in Hammaguir, Algeria. In the 1950s, this country was still an official part of France, and thus the desert was seen as a good location to experiment with launches (Chambaz et al., 2021). When the Evian Accords for Algerian independence were negotiated, the Algerian government made it a stipulation that the rocket facilities would be removed. This set into motion a search by CNES to find a launch location elsewhere. A list of criteria was created (CSG, 2019) and fourteen shortlisted sites were ranked according to their suitability. These criteria included ones based on technical possibilities, climatic conditions, as well political and financial motives.

French Guiana emerged as the most favorable launch location. A key justification is its place in relation to the equator; the territory lies at approximately five degrees North latitude, which means that launches gain extra performance from the “slingshot effect” (ESA, 2021). Additionally, the weather conditions are favorable; the region knows very few lightning storms and there are no tornados or typhoons, unlike north in the Caribbean. On top of that, the territory faces the sea both north and eastwards, allowing for launches with multiple types of trajectory.

However, another very important aspect was the political feasibility of this project. As an official department of France, integrated in 1946, choosing to place the space launch center in French Guiana meant no interference from an additional government. Many of their other options, with Australia and Brazil ranking high, would mean less independence and a substantially more difficult process of creating a French-led project. In the reports on the decision process, now stored at the archives of the Centre Spatial Guyanais, another element becomes clear: political stability was an important factor, in particular a lack of call for independence by the population of French Guiana. In the same report, there is one perceived issue: the local population is said to be “sensitive and does not always see where their interests lie when we do not explain it to them” (authors translation of “*celle-ci est cependant assez susceptible et ne voit pas toujours ou est son intérêt, quand on ne lui explique pas*”) (CSG Archives 1964). This clearly shows the colonial undertone of the project of the launch site, where it is assumed that the people leading the project better know what is good for the local population than they do themselves.

When the decision was made to place the launch site in Kourou, not only did the infrastructure itself have to be built, but there was also a need for supporting facilities and services for its labor force. At that time, the region was inhabited by several Creole and Amerindian communities, who were reliant on agriculture for their subsistence and mainly lived in open, spacious, wooden housing. However, these were on the grounds envisioned for the rocket launch base and thus, new housing was created for those communities as well as for the influx of a labor force coming from across the larger region (including neighboring countries) and employees coming from Metropolitan France (Gorman, 2007). These urban projects were mainly led by the CNES and included larger plans for social services like a school, hospital, hotel, and sports facilities. Thus, the spaceport was accompanied by a particular vision of what life on Earth is and should be like, reflected in the design of the town supporting its service (CSG Archives, 1965). The new set-up of Kourou clashed with the existing ways of living in the region. Particularly the agricultural practice of “abattis”. This slash-and-burn form of agriculture, where the concept of property rights over land are fluid and territorialization is practiced through these spontaneous and nomadic agricultural practices (Demaze & Manusset, 2008; Tsayem Demaze, 2008), was no longer possible in the same configuration. With the arrival of the launch site, CNES claimed the land and displaced the Amerindian and Creole communities.

This has left a scar and generational trauma for the families that were displaced. Recently, Juliana Chocho-Dufail (2023) published a book that recounts the story of her and her family at the time of expropriation. She chronicles how the families had to leave their open-style wooden housing and instead were forced to live in small flats in concrete buildings and how they were provided with plots of land, but those were on the other side of the river and hard to reach without a car. In a conversation in the spring of 2023, she tells me how her community was forced into a change in living habits to accommodate the arrival of the space industry.

The case in French Guiana shows that access to outer space required others to reshape their relation to the land, where a practice of resource sharing was complicated by the enforcement of a foreign system on a well-established way of inhabiting the world. It thereby creates a trade-off in which access to one potential global common means the restriction of another.

DISCUSSION

The launch site in French Guiana is not the only rocket base that knows a complex history and an ambiguous present.

Woomera in Australia was long used for English and European sounding rocket tests, even though its placement was contested and fought by the Indigenous inhabitants (Gorman, 2007). Baikonur is located in Kazakhstan and leased by the Russian Federation for use by ROSCOSMOS, the Russian space agency. The launch site has long posed problems for local communities due to space debris falling in and around their villages and has sparked concerns about deteriorating health impacts for people living closeby (Kopack, 2019; 2021). More recently, in Boca Chica SpaceX's Starship test site has caused uproar as both people living in the region and ecosystems have been forced to move or adapt (Keates & Maremont, 2021; Roulette & Mindock, 2023). Yet, these sentiments are not universally shared and many people within these regions are and will be proud to host launch sites (Szolucha, 2023). Still, as the narrative of an exploration to benefit all is used to justify these infrastructures, it is important to point out their ambiguity.

Existing space infrastructures are already deeply entrenched in Earthly governance structures and have the potential to further exploit existing power dynamics. So, in the process of discussing potential regimes, may they be around Earth's orbit (X. S. Yap & Truffer, 2022), space resources (Rabitz, 2023) or the Moon (Tepper & Whitehead, 2018), considering the underlying processes already in place can provide important considerations regarding implicit consequences. As previously discussed, the key legal framework on which most outer space exploration is based is the Outer Space Treaty. It is important to address that here it is the activity of exploration that is stipulated to be the province of all mankind, not "the physical domain of outer space itself—the three-dimensional expanse, beginning above airspace and extending infinitely outwards" (Hertzfeld et al., 2015, p. 3). Neither does the Outer Space Treaty use the concept of "commons" in any of its principles. Looking at space infrastructures and space accessibility gives an entry point into the discussion that awaits "about how property rights, environmental sustainability, space settlements, appropriation and free access, liability claims, insurance duties, and so many other concepts should be interpreted in view of the contemporary and expected uses of outer space, whose global commons character is at stake" (Rementeria, 2022, p. 9).

And that discussion is becoming increasingly pressing, as the global common character of outer space, which has not been solved to date, is further under question with the impetus of space missions and the entrance of new players on the market in recent years. Despite the fuzziness of the current state of outer space, multiple nation-states have expressed that they perceive outer space as a global common (European Union, 2023), while others have moved away from that idea with the former US president explicitly

saying it is not (Goehring, 2021). A text analysis study on space arrangements conducted by Pic. et al, (2003) shows that in most cases, there is no clear stipulation or mention of the commons, "indicat[ing] that most powerful space actors tend to avoid commons-related principles in their arrangements" (p.296).

This has become particularly clear in new legislation that is being developed. Luxembourg has adopted a law that allows for space resources to be owned by private companies (Tepper, 2019a), while the United States passed the "Commercial Space Launch Competitiveness Act" which asserts that US citizens are entitled to asteroid or space resources obtained (Reaven, 2016). Closer to home, NASA has set up Artemis Accords as they deem "a common set of principles to govern the civil exploration and use of outer space is necessary". These accords are non-binding multilateral arrangements, with currently 31 countries party to the it (NASA, 2023b) and have come to replace the much less popular Moon Agreement. This 1979 agreement is more explicit in its intention of concurring with the concept of the commons and calls the Moon the "common heritage of mankind". Furthermore, the agreement actively prohibits any kind of property claim to lunar resources. It is this rigidity that dissuaded many of the spacefaring nations from signing the agreement (Nordman, 2021) and has created this move towards alternative governance structures. Even though NASA stipulates the Accords are in agreement with the Outer Space Treaty, this has been questioned by scholars (Osada, 2022), particularly its feasibility given that other major space players like Russia and China are not, nor are expected to be, part of these accords (Nelson, 2020).

As the global commons character is under contention, it is important to consider the role of accessibility. As Rementeria (2022) argues "What matters most to hold sway is not the potentials or availability of material possessions but rather having the capacity to control the access and make decisions on a set of underlying power structures" (p. 3). Up until now and in the foreseeable future, launch sites are the key infrastructure where the access enabling techno-scientific exploration is negotiated. This might not undo the principle of the OST in theory, practically it means that only those nations with launching capabilities or agreements with launching states are able to make use of this principle. The launch sites and their management show the national power governing the accessibility of outer space and how they are often placed in locations where "a routine form of rocketry directly crosses the remains of less final frontiers" and because of that "we must also factor in their historical mass and inertia, as well as potential isotopes of colonial rule" (Redfield, 2002, p. 813). This leaves the question if a global common approach to outer space governance is

possible if access to outer space remains monopolized by a few key stakeholders with their own agendas, priorities, and interpretation of the OST. If following the notion that outer space is a global commons, that it falls outside of national jurisdiction might hold up theoretically, but practically this serves those who manage the access.

As nations with space capabilities are increasingly setting the tone of what is and what is not possible in outer space, the chances of alternatives are slinking (Rementeria, 2022). Thinking about the role that outer space infrastructures play in creating this monopoly of access is important as it has implications for the feasibility of past and future governance structures of outer space. “The rapid development of space-based infrastructure is also causing new sustainability challenges, both on Earth and in space” (X. S. Yap & Truffer, 2022, p. 187) and this can be extended into including questions of the social inequalities perpetuated and created by the space industry. In future space governance talks, particularly between those who want to work towards “sustainable, just, and peaceful use of outer space” (p.187), these Earthly consequences need to be taken into consideration. The tapestry of motivations is diversifying with new actors entering the space market (Atkins, 2022; Stang, 2013) which makes it difficult to anticipate how much the benefits for users, might that be nations or generations, will deteriorate due to the exploitation by other actors. As outlined in the scenarios paper in this special issue (X.-S. Yap et al., 2023), different actors have vastly different priorities in outer space. Wealthy entrepreneurs who are often typified as “space billionaires” and large-scale space companies will be driven by profit first and benefits second, as their business models often work on a return of investment on a relatively short scale (Valentine, 2012). National actors will have their own interpretations, often prioritizing military action as well as actions that are framed to be beneficial for the public good (e.g., scientific discovery), but even that is highly dependent on the nation itself (Aima, 2018; Olson, 2018). Given that there is no common agreement on the benefits of outer space in the present, it makes it even harder to anticipate what possible benefits for future generations could be at stake: for one, because the knowledge of what is (not) in space changes rapidly with new observations and discoveries.

However, each and every one of those actors is reliant on Earth-based infrastructures, and therefore “ask[ing] what kind of access is promoted by such a model, for whom, and under what conditions?” (Sammler & Lynch, 2021, p. 705) should be at the base of any governance debate. The point of this paper is not to come to conclusive remarks on the interpretation of the Outer Space Treaty. Here the global

commons are taken as a theoretical concept of which it is recognized that this is not a globally adopted principle. Rather, it brings a practical angle into the theoretical debate by focusing on the accessibility of outer space, which is relevant in both theoretical as well as practical conceptions of outer space as a global common (Hertzfeld et al., 2015). No matter the interpretation of benefits, all actors are dependent on access to outer space. Understanding who currently has access, how that access is negotiated, and what we should learn now about accessibility to outer space in order to make the concept of a global commons feasible, therefore is a valuable angle of entry into the practicalities of outer space as a global common. Pic. et al (2023) posit that “viewing outer space as a global common is neither a universally accepted nor a clearly defined concept. Rather than assuming this to be the case, we should recognize it as a project that requires further development” (p. 297). In the process of shaping this concept, alternative approaches to the prevailing paradigms of space exploration can offer valuable insights.

CONCLUSION

Given the technological, historical, and political dimensions on which space infrastructures currently rest, it is hard to imagine a scenario where outer space is not just theoretically open for exploration by all nations, but where the exploration at a nation’s own terms is practically attainable. As outer space currently stands, physical presence, may that be technological or human, in outer space does not exist without Earth-based infrastructures which are highly limiting in their use. That means that the governance of outer space is directly linked to the governance of existing systems. The case studies have highlighted the entrenchment of Earth-based space infrastructures with injustices and inequalities and the trade-offs between different types of commoning.

My intention is not to disqualify any benefits from space exploration even though there are complicated and arguably negative outcomes attached to it. Rather, the case studies complicate discussions about the benefits of space exploration and radically question what those would entail. Through grounding the discussion in real-life examples, the idea of a global commons becomes simultaneously more difficult to obtain, yet more realistic in its output. Rather I attempt to “stay conscious and work with the ambivalences of power to help commoning efforts to avoid inadvertent exclusions and harm to both human and non-human others, exclusions which can undermine long-term commoning goals” (Nightingale, 2019).

This paper does not offer any solutions to the problem of access and placement of Earth-based space infrastructures. Rather, it aims to open the space for critical examinations of future scenarios where the ambiguity of existing space treaties is addressed. I argue that outer space is already deeply embedded in Earthly infrastructures and dynamics. This article serves to radicalize ideas about the benefits of space exploration, identifying issues on Earth that are deeply entangled with space infrastructures and showing that whatever (future) benefits will be exploited in the future, there are always tensions and trade-offs in the process of obtaining those on spatial or temporal scales. Through this, I hope to contribute to the promotion of a dialogue that challenges and informs discussions on space activities being for the benefit of all of humanity, but not shying away from the ways in which it is not (Wiser & Aganaba, 2023). The messy reality of current space infrastructures needs to play a key role in explorations of the feasibility and form of governance of outer space. This can help advance the discussion on the commoning in outer space, and how Earthly entanglements can hinder, restrict, or provide surprising solutions to conceptions of the future.

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