

6 The Infrastructural Nexus Aloft: Worldmaking Projects in the Air and Outer Space

Heidi Tworek and Diana Lemberg¹

6.1 Introduction

Both History and International Relations (IR) as disciplines have long taken information for granted. But that has started to change dramatically. In History, works like *Information: A Historical Companion* have shown how the concept shifted over time and space (Blair et al. 2021). Meanwhile, IR scholars like Jan Eijking are using historical material to explore how ‘information is not just an epistemic resource but a means of global ordering’ (Eijking 2025: 537). But information relied upon infrastructure that in and of itself offered global ordering. Or, as we describe it in this work, ‘worldmaking projects (WMPs)’.

Eijking focuses on the interwar period, examining Paul Otlet’s and H.G. Wells’ suggestions for global ordering of information. This examination showed that ‘promoting a world united by information was entirely compatible with infrastructurally reproducing an imperial division of the world by degrees of ignorance’ (Eijking 2025: 537). Eijking’s finding dovetails with questions fundamental to this project: how do worldmaking projects (WMPs) interact? How do intellectual visions of the world interact with infrastructure? And vice versa?

In this chapter, we explore the interaction of WMPs by examining infrastructures in the air and space. We do so, not because land-based

1 Heidi Tworek also acknowledges support from the Canada Research Chair programme (CRC 2020–00132).

infrastructure is not important. But as Kimberley Peters, Philip Steinberg, and Elaine Stratford point out, it is also crucial to contribute to ‘challenging the land bias of our understanding of territory’ (Peters/Steinberg/Stratford 2018: 2). Our attempts to understand WMPs led us to hypothesize that the air was a particularly interesting space to understand how and why WMPs interact, especially when new communications technologies opened up new ways to interact with the air. We also try to combine tracing intellectual visions for WMPs with practical attempts to instantiate them.

This chapter also answers the second aspect of the call by Peters, Steinberg, and Stratford for further exploration to study submarine cables and extra-planetary spaces, including satellites, as a way to explore ‘territory beyond terra’ (Peters/Steinberg/Stratford 2018: 10–11). Here, we examine extra-planetary spaces, particularly satellites and radio spectrum.

Looking at communications infrastructures at a particular moment in time enables us to explore the messy interactions between WMPs. This chapter examines two forms of interaction in the air with two different communications infrastructures. First, we examine wireless/radio as an example of cooperation to uphold WMPs. We investigate how an imperial WMP intersected with an internationalist WMP in the interwar period. In this arena, cooperation over wireless infrastructure brought together seemingly competing political visions of the world. This suggests that the usual political divisions, developments, and periodization don’t necessarily make sense when viewed through the lens of communications infrastructure. Rather, WMPs such as imperialism may offer a more useful way of understanding some periods such as the 1920s and 1930s beyond concepts like (de)globalization, which, as Frederick Cooper has pointed out, are problematic in similar ways to modernization theory, because ‘the key variables of transition did not vary together’ (Cooper 2005: 97).

Second, we examine competition in the rise of satellite communications in the 1960s and 1970s. Satellites seemed to offer a new opportunity for worldmaking. This was particularly because their emergence occurred just as decolonization was really gaining steam in the 1960s. Anti-

colonial actors mobilized both nationalism and internationalism in a series of intertwined debates over how satellite communications should be pursued and regulated, helping to generate new ways of thinking about planetary and extra-planetary spaces and resources. Yet satellites also remind us of the stickiness of older WMPs and of how existing debates could still shape infrastructures. Even as the undemocratic aspects of an imperialist WMP seemed to fade on land, they continued in the air.

These examples offer a chance to delve into different modes of interaction between WMPs as well as actors attempting to uphold or contest WMPs. Both collaboration and contestation could happen, with communications infrastructures as key sites for those interactions.

6.2 The Interwar Wireless World

Wireless was still a comparatively new technology during the interwar period. Although it was developed over the late nineteenth and early twentieth centuries, it was mainly used by navies until the early 1910s. A few governments, particularly the German government prior to World War I, seized upon wireless as a way to counter what they saw as British-dominated submarine cable networks. Germany attempted to create the first 'world wireless network,' with those desires accelerating during World War I when Britain cut all but one of the submarine cables connecting Germany to the outside world (Tworek 2019a: chapter 2). Such history would seem to indicate that wireless infrastructure fit into an imperialist WMP, where this new communications technology served competitive expansionist goals.

However, at least one use of wireless in the interwar period suggests other modes of interaction within and between WMPs. Here, we examine the realm of health and the use of wireless to try to prevent pandemics. Wireless served as a site of cooperation within the imperialist WMP: different empires cooperated to provide wireless infrastructure that would inform them about possible epidemics. Simultaneously, this system was operated by the new League of Nations Health Organization (LNHO) and the LNHO saw this system as a flagship of demonstrating

its importance for internationalist aims. In this example, then, wireless infrastructure bolstered imperialist and internationalist WMPs simultaneously. There was no contradiction between them, but rather synergy.

During the 1920s, the LNHO created and coordinated a voluntary communications system that covered two-thirds of the world's population. This system elevated information to the center of epidemic management. Such a system did not exist during the influenza pandemic of 1918–20. Western states had tried to establish an information exchange since the mid-nineteenth century through multiple International Sanitary Conferences. But technical needs often did not result in agreement or institutions.

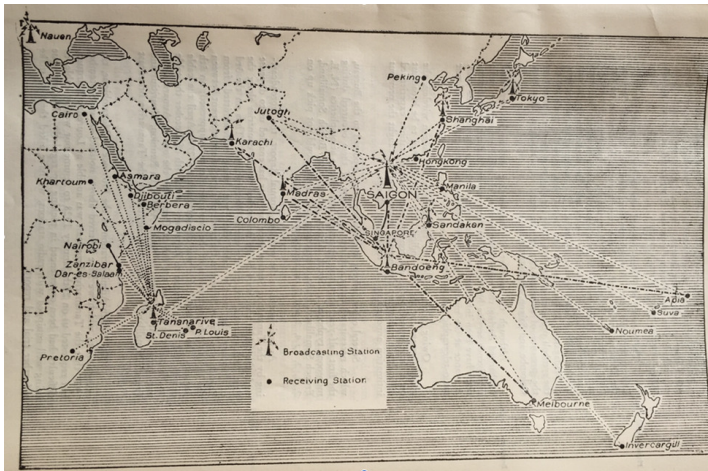
A world epidemiological information system only emerged through the League of Nations in the 1920s, in large part because of new wireless infrastructure. The crucial difference with wireless was its ability to reach ships on the sea: ships could thus provide information about potential infectious disease cases on board before they reached a port. The epidemiological information travelled more swiftly than humans across oceans and, at least theoretically, could enable those on land to prepare before infectious individuals arrived. The LNHO epidemiological information service formed the foundation for a communications infrastructure that the World Health Organization still uses today. Indeed, the origins of this system explain many of the current issues within pandemic management (but that's more of an aside for the purposes of this chapter).

Pandemics and epidemics such as cholera or influenza were a necessary, but not sufficient condition to facilitate the emergence of a global system. The further conditions were the existence of an international organization (the League of Nations) and new wireless communications infrastructure. Over the course of the 1920s, the LNHO fairly swiftly built a system that incorporated information from territories around the world, collated that information, and distributed it. The League pushed territories to standardize their reporting on infectious diseases and created a bureau in Singapore to facilitate swifter collation and distribution of material beyond European headquarters of the LNHO in Geneva.

The LNHO system is pertinent for three further reasons. First, the LNHO's annual reports included maps that we can examine to understand how communications infrastructure interacted with WMPs. Second, it shows how international organizations can be useful sites to explore WMPs. Finally, this infrastructure raises the central question of who is excluded.

For example, look at this map from an annual report on the LNHO system in 1928 (produced for the main funder, the Rockefeller Foundation) (League of Nations Archive (LONA) 1928). Similar maps appeared in most reports. They depict an infrastructure organized around port cities, colonial networks, the sea, and the air.

Figure 1: Map, *Annual Report on the LNHO System (LONA 1928)*



What we see in such maps is both international and imperialist WMPs at work. The LNHO coordinated between multiple empires to use their wireless towers to collect and distribute its weekly epidemiological bulletins. The international ideals of the LNHO were crucial to the creation of this system: ‘The focus on empires and nations as political

units elides how international organizations like the LNHO could foster cooperation over information and infrastructure not created by the League itself (Tworek 2019a: 815–816). This case also illustrates cooperation at a moment in time when studies on trade or migration would suggest disintegration.² Information infrastructure helps scholars to see interaction and the creation of global systems, where other arenas might have suggested disconnections.

But this infrastructure also highlights how the international WMP was intertwined with and dependent upon an imperialist WMP. What the League created was not so much an international system without regard to existing political units, but one where empires in particular worked together to provide infrastructure. The League fostered inter-imperial cooperation where each empire had different motives but all wanted to be included. For example, Japan remained in this system in the 1930s because it was interested in knowing about potential disease outbreaks in regions that it might want to invade. Despite such motives, note how the lines between towers on the map emphasize cooperation and links between imperial territories. Wireless towers based in British, French, and Dutch colonial territories along with Japan and China cooperated to broadcast material collected and collated at the Eastern Bureau of the LNHO based in Singapore. This created a communicative ‘inter-colonialism’ (Akami 2017).

Another example is Nazi Germany. Even after Nazi Germany had left the League of Nations in October 1933, it continued to provide wireless infrastructure for the LNHO system and to distribute epidemiological bulletins. Fascist countries could, and did, cooperate with empires and democracies over communications infrastructure long after political cooperation had appeared to cease. In fact, cooperation around this system continued outside Europe after 1939 and only fully broke down in 1942 after Japan invaded colonial territories in South-East Asia. Frank Boudreau, a former Health Organization official, proclaimed in 1940: ‘it is one of to-day’s paradoxes that the world which is destroying international co-operation by every means in its power is being saved from pos-

2 On the interwar world, see Denning/Tworek 2023.

sibly devastating epidemics by international co-operation in health matters' (Boudreau 1940: 17). Communications infrastructure enabled this cooperation, even if Boudreau over-estimated the LNHO system's ability to prevent pandemics. The larger point is that WMPs go beyond classic political divisions; communications infrastructures help scholars to see how WMPs can unite across more 'traditional' political divides like fascism or democracy.

The LNHO's own motivations stemmed from an internationalist vision that it could provide certain services beyond what any individual policy. These capabilities lay particularly in the realms of information collection, collation, and provision as described above as well as in the realm of comparison. The LNHO's director, Ludwik Rajchman, noted in 1932, for example: 'There is however one practical branch of Preventive Medicine in which the Health Organisation could render unique service and give information that is not only not available elsewhere but which only an international organization enjoying close contacts with the different national Health Services can provide. I refer to the comparative results in different countries of the practical application of various Public Health methods' (LONA 1932: 1).

Rajchman grounded these observations in the LNHO's experience with its epidemiological service, stating that 'The need for comparative information with reference to statistics is already shown by the very considerable number of requests for information constantly received by the Epidemiological Service of the Health Organisation' (ibid.: 2). Rajchman's internationalist vision for the world was one where comparison would lead to national legislation: the international would standardize national statistics and public health into comparability; the LNHO would collect and distribute that comparable material; then national legislations would enact policy accordingly. Rajchman thus believed in 'the value of a comparative knowledge for those administrators called upon to determine a policy of legislature and to draw up either national laws or local bye-laws in connection with public health' (ibid.: 2.).

Such empirical observations suggest that we might define WMPs based on the general characteristics and relations they ascribe to political entities. Competing empires can pursue the same imperialist

WMP under particular conditions. In this instance, they first shared the view that the political world should be divided into competing imperial spheres of power/ influence. Second, they cooperated in other arenas, here health, to try to ensure the maintenance of an imperial order. The collaboration between different empires (each to fulfil its own different interests) strengthened the imperial order in quite practical ways, at least for a time and with lasting consequences for the practices of global health.

At the same time, these illustrations and reports hid the hierarchies of access: colonized peoples could not participate in this system and they were subject to how colonial officials and public health elites decided to use communications infrastructures. Such maps also erase the colonial attitudes to disease origins that underpinned cooperation. Specifically, the focus on Asia drew on beliefs that pandemics were more likely to emerge there, with many nineteenth-century disease outbreaks labeled 'Asiatic cholera pandemics' in Europe and the United States (Harrison 2012: chapter 6; Downs 2023; McGovern/Wailoo 2023). More broadly, the maps suggest a tight relationship between an imperialist WMP and infrastructures designed for one-way transmission. In attempts to 'control' information, one-way transmission offered an illusion of restricting information exchange that could cement particular worldmaking projects. The asymmetries of who could send and receive information persisted into the early satellite era and beyond.

Of course, the much better-known story of international wireless communication in the 1920s and 1930s is that of competition, particularly between British and German radio propaganda. The BBC established an Empire Service in 1932, while the Nazis pursued global expansion of radio propaganda after they came to power in January 1933 (Potter 2012). The Nazis made radio a priority for retaining power at home and garnering support abroad. Such propaganda systems operated alongside attempts by major powers to erect barriers to international broadcasting, particularly through jamming wavelengths from other states. These attempts ramped up during World War II, for obvious reasons.

Even in competition, though, there was consensus that radio infrastructure offered an opportunity to influence politics. And there was surprising consensus on what tools to use: jamming others and broadcasting one's own material simultaneously.³ Communications infrastructure became a focal point of competition. But in so doing, it created consensus that communications mattered.

As Charles S. Maier wrote in a footnote in his work on territoriality, communications created a 'spatial domain that has never been bordered so rigidly, indeed that challenges the territorial limits that prevail at any moment' (Maier 2016: endnote 8, 301). But communications infrastructures were also clearly part of imperial repertoires, i.e. 'the multiple ways in which incorporation and difference were conjugated' (Burbank/Cooper 2010: 1). It seems clear that conventional political periodization and categories simply don't capture what was happening, who was cooperating/competing, and why. This case shows how communications infrastructures were part of the imperial WMP repertoire and how international organizations could facilitate the worldmaking of imperialism. Further, any suggestions of internationalist WMPs have to account for imperialism and how it intertwined with internationalism from the start.

Finally, the same infrastructural nexus also helped anticolonial nationalism to form as a separate WMP that worked against imperialist (including imperialist-nationalist) projects, while on some political levels also cooperating with them. By looking at this specific example, we try to describe these different kinds of relations as precisely as possible in order to show how complex and messy world politics really were (and are).

6.3 Early Satellite Communications

If the history of interwar health communications reveals surprising cooperation between diplomatic and ideological rivals, our second case

3 On international radio more broadly, see Potter et al. 2022.

study, early satellite communications, points to another form of relation between WMPs: contestation. As debates around early satellites whirled in the 1960s and 1970s, they illustrated clashes between a lingering imperialist WMP and overlapping anticolonial, nationalist, and internationalist visions for organizing the world. By examining several facets of these debates, we aim to tease out how efforts towards a more egalitarian political order could take on different forms depending on the context.

This case study also demonstrates how emphases on the novelty of a technology and its relation to time – the ‘*ageofism*’ of the ‘space age’ – can mask a certain conceptual stickiness, which becomes visible when we examine such contestations in a longer-term framework. Seemingly terrestrial concerns like scarcity and sovereignty remained pertinent even in the heavens (Fressoz 2022). This is not to deny the novelty of satellite technology itself. Rather, it is to point to one of the themes of this volume: the ways in which even new infrastructures are entangled with existing dynamics in world politics. While U.S. policymakers touted space as a ‘new frontier,’ Washington’s efforts to treat it as such were inscribed in existing patterns of thought and action, as suggested by that loaded word *frontier*.⁴ Real creativity at the intellectual and regulatory level was often happening elsewhere, as part of anticolonial and internationalist worldmaking.

Thirdly, though, contestation did not necessarily always assume the form of a binary struggle between East and West (as in Cold War discourses) or between North and South (as some contemporary scholarship would have it). Debates over space communications were also characterized by occasional synergy between the superpowers; concerns that bridged North-South divides; and surprising intra-bloc divergences, for instance. Attending to these moments of rupture and coalitional possibility may be crucial for figuring out how to combat resurgent imperialism in outer space in our contemporary moment.

4 On the successive frontiers animating U.S. terrestrial, maritime, and spatial expansionism, see Black 2018.

Early satellites (1960s–1970s) generated several overlapping but non-identical debates, four of which are schematized below. ‘Overlapping’ because many of the same principles recurred; ‘nonidentical’ because of the subject matter and also because the alignments of actors and WMPs varied. The debate revolved around:

1. The legal regulation of outer space qua space.
2. The division of frequencies and the problem of spectrum scarcity.
3. Direct broadcasting satellites and questions of cultural sovereignty.
4. Remote sensing and questions of data sovereignty.

First, (1) debates around the *legal regulation of outer space*:

Like the development of airspace law a half-century earlier, debates around the legal regulation of outer space in the 1960s at first centered on the question: what were the ‘vertical limits of sovereignty’? Airspace law had eventually crystallized, at the Paris Peace Conference in 1919, around the principle that each state enjoyed ‘complete and exclusive sovereignty over the air space above its territory.’ Overflights required consent (Hay 2012: 25; Collis 2012: 64–65).

But airspace precedents would be contested by alternative legal geographies that drew on other governing principles. One of these was a first-come-first-served, *res nullius* approach to the scarce geostationary orbit (GEO) space just above the equator, which quickly became the preferred placement for communications satellites. This approach favored the spacefaring powers, especially the United States.⁵

A third approach was more innovative. This was the ‘Common Heritage Principle’ (CHP), which proposed that material benefits from the global commons belonged to humankind and should be distributed among states as such. Cultural geographer Christy Collis calls the CHP a

5 For a variety of reasons, the Soviet Union opted for a non-geostationary (also called non-geosynchronous) system for its early satellites. For the Americans, on the other hand, the GEO retained its importance for decades, until the maturation of low-Earth-orbit (LEO) satellite technology in the 2020s (Evans/Lundgren 2023: 30–34; Kelvey 2025).

‘radical new legal geography’ that ‘proposed to supplant the dominance of the legal geography which had defined the Earth since the 1648 Peace of Westphalia’ (Collis 2012: 68). Advocates of world governance had proposed common ownership of ‘earth, water, air, [and] energy’ in the 1940s, amid intensifying concerns about how to equitably govern these resources (Meyer 2022: chapters 2–3). As early as the early 1960s, Latin American states proposed that outer space, too, should be treated as the common property of humankind (Durrani 2019). The CHP was formally announced in relation to the high seas in a 1967 speech at the United Nations by Maltese diplomat Arvid Pardo. It was applied the same year to outer space by the Argentine diplomat Aldo Armando Cocca. The application of the CHP to outer space illustrates a point made by IR scholars Adom Getachew and Patrick Quinton-Brown: anticolonial and developing-world actors (i.e., the anticolonial WMP) were not limited to making sovereignty claims against the global North. Their worldmaking could incorporate both self-determination and global justice, anticolonial and internationalist principles (Getachew 2019; Quinton-Brown: 2024: 6–12).

The United Nations entered the picture in the early 1960s. In 1963 the General Assembly passed a resolution stating that sovereignty claims were not valid in outer space. This actually suited the spacefaring powers: As Collis explains, ‘[By] 1967 the GEO was a space for the developed world, and particularly for the United States; at the end of 1966, only the United States and the Soviet Union had launched satellites, and all eleven of the satellites in the GEO were American.’ In 1967, Washington, Moscow, and others formalized space as being outside sovereignty claims – as well as agreeing on the principle that it should be used for peaceful purposes only – through the UN Outer Space Treaty (Collis 2012: 67).

But if there was widespread consensus on establishing a non-militarized outer space open to all, many were not happy with applying a first-come-first-served, *a posteriori* approach to the GEO. This time, though, concerns cut across North-South lines, spanning postcolonial states and historic heartlands of empire: Discontent came from European powers who relied, until 1983, on American launchers for their broadcasting

satellites, as well as from developing states that did not have their own satellites or launchers.⁶

Thus, the Outer Space Treaty of 1967 adopted a kind of hybrid philosophy for outer space: While not subject to state sovereignty claims, space was also not to be a purely commercial free-for-all. Article I declared that ‘the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries irrespective of their degree of economic development’ (cited in Collis 2012: 68). Subsequent negotiations at the International Telecommunication Union (ITU) and the UN have reinforced its status as a scarce resource. The ITU, however, lacks enforcement capacities, and this has led to recurring controversies, given that the capacity to develop and launch satellites was and remains asymmetric (Collis 2012: 69–77). The Outer Space Treaty is still in effect today, and these older questions—about the scope of international regulation as against national and commercial interests—still pertain in contemporary debates about space policy (Baiocchi/Welser IV 2015; Deudney 2020).

Meanwhile, the principle of sovereignty would recur in space debates in 1975, when Colombia claimed sovereignty over the GEO located above its territory. The next year, 1976, it joined forces with six other equatorial states – the Republic of the Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire – in what was known as the Bogotá Declaration, with Brazil taking part as an observer. In order to circumvent the Outer Space Treaty, the Bogotá signatories declared that the GEO was not part of outer space but was rather a natural resource created by the Earth’s gravitational field and was thus subject to state sovereignty (Collis 2012: 70–72; Beery 2016). This was a forceful, nationalist maneuver that received broader support from other developing states for a time. Eventually, that support waned; by the mid-1980s, Argentina, Chile, Brazil, and Mexico as well as Egypt and India had moved toward the view that the GEO formed part of outer space and was thus subject to the Outer

6 In the 1970s, NASA had used its launch capabilities to limit European satellites to noncommercial broadcasting (Lemberg 2019: 142–143; see also Collis 2012: 70).

Space Treaty (Roth 1992: 197–213). But despite the apparent failure of the Bogotá Declaration, some scholars have credited it with challenging global North geographies of space. As historian and international law scholar Haris Durrani points out, ‘Today, the Colombian Constitution still contains a provision claiming sovereignty over the orbital segment above the country’s territory’ (Durrani 2019; see also Beery 2016).

Second, (2) debates around *the divvying up of broadcasting frequencies*:

While the emergence of space law and the CHP approach constituted genuine innovations, the regulation of satellites’ frequencies was absorbed into existing governance structures in a more straightforward fashion. Interference between terrestrial radio signals had motivated international collaboration to manage the electromagnetic spectrum since the 1930s, when the ITU was formed as a merger of telegraphy and radio standard-setting bodies. In the 1940s, the UN absorbed the ITU. Through the mechanism of the World Administrative Radio Conference (WARC), the ITU adjudicated satellite frequency discussions, starting with the first Space-WARC in 1963.⁷

The reality of scarce broadcasting spectrum thus underwrote calls for multilateral governance of satellite frequencies. Over time, scarcity concerns became less acute, as advances in multiplexing enabled more signals to travel harmoniously on existing bandwidths (whether these signals came from terrestrial or satellite sources).⁸ But this issue nonetheless illustrates how international regulation tends to require, among other things, that multiple actors/WMPs perceive scarcities in common.⁹ To take a more contemporary example, the scarcity of the rare-earth minerals that go into cell phones and other gadgets has implications for governance of the seas as well as outer-space mining.

7 On the Space-WARCs, see Collis 2012, see esp. 66–67.

8 On scarcity as a historically contingent concept, see Stamm 2015.

9 It is worth noting that shared perceptions of scarcity do not necessarily lead to identical solutions. They shaped, e.g., the very different systems that the United States and Britain pursued in regulating their domestic airwaves (Stamm 2015: 57).

Third, (3) debates around *direct broadcasting via satellite*:

Direct-broadcasting satellites (DBS) are satellites that can broadcast directly to individual/home receivers. While the first DBS was launched in 1974 as part of a developmental collaboration between U.S. and Indian space authorities (the Satellite Instructional Television Experiment, or SITE), DBS was not commercially widespread until the 1980s (Krige/Callahan/Maharaj 2013: 235–246; Kaplan 1985: A1; Feder 2002). Before then, communications satellites typically broadcast to terrestrial ground stations, which then relayed their signal to end users. This need for earthbound relaying gave the national post, telegraph and telephone (PTT) monopolies that controlled receiving infrastructure in much of the world leverage over satellite content.

In the 1960s, Washington had attempted to quell fears around satellite broadcasting by promising to respect sovereignty: As Lyndon Johnson announced in a special message to Congress on communications policy in 1967, satellite broadcasting ‘does not mean that the United States – or any other nation – will give up vital sovereignty over domestic communications. The flow of satellite communications – both domestic and international – is to and from ground stations owned by the individual nation or its representatives’ (cited in Lemberg 2019: 135). But international actors were wise to question Washington’s good faith as the technology of DBS appeared on the horizon.

The anticipation of DBS provoked anxiety and intense debate over how spatial information traffic should be managed and regulated. We might consider the DBS debates part of a longer cycle of modern ‘technology panics,’ the flip side to recurrent techno-utopianism (Orben 2020).¹⁰ As early as 1963, ITU official Jean Persin was depicting DBS—still nearly two decades from commercial viability—as potentially destabilizing to international regulation and national sovereignty (cited in Lemberg 2019: 147). Before that, terrestrial radio communications had

10 Orben discusses technology panics primarily in relation to psychology (especially child psychology and concerns that new technologies will negatively affect child development) and domestic policy solutions.

produced similar concerns. Again, by studying communications infrastructures in a longer durée, patterns become visible that suggest how prior international contestations, mediated by existing infrastructures, can shape the reception of new technologies.

The controversies swirling around DBS at UNESCO and the UN from the mid-1960s through the 1970s are also interesting for the way alliances at times cut across East-West and North-South divides. The superpowers closed ranks in the 1967 Outer Space Treaty against calls to restrict direct broadcasting (Schwoch 2009: 74, 152–153). On the other hand, sovereignty was not exclusively the concern of Third World actors (in contrast to American efforts to tar it as such). France (1963) and Egypt (1966) both proposed international bans on direct broadcasting, while Argentina's Aldo Armando Cocca insisted on the need for multi-lateral regulation, approvingly citing both western European and Soviet criticisms of Intelsat, the U.S.-dominated consortium for commercial satellites (Lemberg 2019: 148; Quinton-Brown 2024: 178–179). In 1972, at the UN General Assembly, the United States was the sole 'no' vote against a proposal that international law should regulate DBS (Lemberg 2019: 149–150).

Americans tried to sell developing countries on DBS by highlighting how it would end the need for them to build costly terrestrial receiving infrastructure. The Stanford economist Ernest Wenrick praised its potential to 'open vast areas not now served to the benefits of the flows of information' (cited in Lemberg 2019: 144–145). But American promises not to undermine foreign regulations were ultimately abandoned. Contrast Lyndon Johnson's 1967 statement with the following 1980 prediction of sovereignty's obsolescence co-authored by Elie Abel, a Stanford journalism professor who had been active in UNESCO information debates (Power, Philip H. and Elie Abel, 21 September 1980. *Third World vs. the Media*. *New York Times Magazine*, cited in Lemberg 2019: 199):

'[The] pace of technology may well outrun the ability of international political institutions to catch up. For example, there is in force today an international treaty prohibiting direct broadcast of television signals from a satellite into a country without that country's permission.

The treaty is self-enforcing because current television sets cannot receive signals from satellites without an enormously expensive dish-shaped antenna. ... But both American and Japanese companies are in the process of developing dishes that may in time become so cheap that families who can afford a television set... will be able to afford a dish as well. Governments may struggle to control the flow of news and information across their borders, but satellites and the technology behind them may make such efforts futile'.

In this rather sanguine American dismissal of regulation, we can see the workings of another WMP, the neoliberal WMP, by which U.S. and other elites sought to circumvent democratic decision-making and multilateral oversight in a world of nation-states (i.e., a world where the possibilities for overtly imperial coercion had shrunk). The founding moment of neoliberalism can be debated, with Quinn Slobodian's recent work dating it as far back as the interwar era (Slobodian 2018). Regardless, it seems clear that satellite disputes between the United States and anticolonial and developing-world actors anticipated Washington's explicit hostility to regulation under the Reagan administration, when it quit UNESCO.¹¹

Neoliberalism as filtered through these debates was not wholly a case of old (imperial) wine in new (neoliberal) bottles: The neoliberal rendering of press and speech freedoms as global and unlimited differed significantly from past precedent – according to which racialized colonial subjects were unready for such freedoms – as well as legal reality. The First Amendment to the U.S. Constitution, contrary to what some American policy elites began to argue alongside the rise of satellite communications, represented less an unbroken tradition of unconstrained liberty than a contingent and domestically circumscribed arena of protected speech.¹² When neoliberal policy elites began to portray national and in-

11 See dissertation abstract for Durrani 2025.

12 The First Amendment did not apply to state laws until 1925, and to films until 1952.

ternational regulation of communications as a ‘global First Amendment war,’ they were up to something new (Lemberg 2019: chapter 7).

Fourth, (4) debates around *remote sensing*:

Remote sensing via satellite is the sensing of terrestrial resources through the reflection of electromagnetic radiation; it ‘[makes] the natural environment more legible by measuring the extremely slight temperature variations of the solar heat bouncing off rocks, trees, water, and even animals.’ The era of remote sensing began with NASA’s Landsat satellite, launched in 1972 (Maher 2019: 204–205).

One recurring phenomenon in the history of remote sensing is efforts to assert sovereignty against it. Like the Bogotá Declaration, these efforts have incorporated anticolonial and nationalist principles while also attempting to shape international law. In 1975, a group of Latin American states attempted to establish, at the UN, the principle of prior consent for remote sensing in a country’s territory. They were concerned that powerful countries and foreign corporations would take advantage of mineral, oil, and other data related to their territories. As with contemporaneous efforts to extend sovereignty to the GEO, this effort failed. Neil Maher suggests that, in the case of remote sensing, NASA ultimately won over objections through a sustained campaign of engagement with scientists and policymakers in the developing world (Maher 2019: 201–214, see particularly 207).

However, the story does not end there. Norms around remote sensing remain contested, for instance when it comes to remote sensing over Indigenous territories. In the United States, tribal authorities have worked with federal agencies for many decades on spatial mapping projects, using the data to oversee infrastructure, protect and manage forests and wildlife, monitor water resources, and protect burial sites, among other uses. However, tribes are not the only parties interested in this data: A 2001 Supreme Court decision ruled that data (encompassing spatial data) shared between tribes and the federal government could be requested by outsiders through the Freedom of Information Act. These outsiders include commercial actors interested in exploiting tribal resources (see, e.g., Shanley 2015: see particularly chapter 4).

In short, studying space infrastructures in terms of WMPs reveals how the debates of the first ‘Space Age’ prefigured those of the present-day ‘Second Space Age.’ The militarization and commercialization of space remain open questions, as do the ramifications of space communications for life on Earth. But even as the United States in the era of the second Trump administration seems to be reviving an openly imperialist WMP when it comes to space (among other geographies), other actors continue to offer alternative visions.

The anticolonial WMP encompasses contemporary intellectual, creative, and political projects aimed at the more equitable governance and use of space technologies. MIT’s Danielle Wood has researched how satellite technologies can contribute to public health and environmental monitoring in the developing world, while artists and scholars like Nuotama Bodomo and Timiebi Aganaba-Jeanty have explored the past and future of African space programs (Wood/Weigel 2014; Kazansky/Wood/Sutherland 2016; Bodomo 2014; Aganaba-Jeanty 2013).¹³ Anticolonialism also encompasses contestations in and over the territoriality of space infrastructures. In 2017, ten thousand protesters gathered at the Guiana Space Center in French Guiana to express their anger over ongoing economic turmoil in the French overseas department (formerly a penal colony). The movement – ‘Let French Guiana Lift Off’ – brought launches at one of the world’s busiest spaceports to a halt. Protesters pointed out that towns neighboring the space center lacked running water and electricity (DAuria/Fernholz 2017).¹⁴

Anticolonialism has in turn shaped internationalism, peeling it away from its interwar embrace of imperialism. Contemporary calls for regulating space junk through international law acknowledge the asymmetries that continue to affect space infrastructures: ‘Whose responsibility

13 Wood and Aganaba-Jeanty both participated in a Smithsonian symposium on Afrofuturism: “Claiming Space: A Symposium on Black Futures – Past, Present, and Potential,” 27–29 Jan. 2022, at <https://airandspace.si.edu/afrofuturism/claiming-space-symposium#outer-space>.

14 On French colonialism and the Guiana Space Center, see Redfield 2000.

is it to remove debris? Who should pay? What rights do non-spacefaring nations have in discussions?’ (Freeland/Handmer 2021). Space junk is rapidly accumulating – and is as equal-opportunity in its territoriality as space capabilities still are not. In January 2025, a glowing metal ring weighing half a ton crash-landed near the village of Mukuku, in southwest Kenya. The Kenya Space Agency identified it as belonging to a launch rocket (Chutel 2025).

Finally, remote sensing via satellite is crucial to contemporary climate science. How are epistemologies of planetary change entangled with the politics of global communications? And how might this infrastructurally mediated knowledge of Anthropocene universals (as some might call our contemporary awareness of climate change) in turn inflict the WMPs of anticolonialism and internationalism? (Chakrabarty 2021). These questions, beyond the scope of this chapter to answer, point to the enduring ways in which the infrastructural nexus persists in the skies of the twenty-first century.

6.4 Conclusion

Over the past several years, many scholars and technologists have pointed to the challenges that digital communications pose to liberal democracies and international cooperation. Public intellectuals such as Evgeny Morozov (2011) and Nicholas Carr (2025) have offered trenchant critiques of digital networking, illuminating its antisocial and antidemocratic aspects. In the academy, IR scholars Henry Farrell and Abraham Newman have similarly emphasized the importance of studying information in political and international context. Farrell and Newman are particularly focused on the interaction between the so-called liberal international order (LIO) that emerged after 1945 and digital communications, which spread a few decades later. They use a historical institutionalist approach to argue that, in the era of the internet and social networks, the liberal principle of unregulated, freely flowing information has had ‘self-undermining feedback effects’ by encouraging flows of illiberal content and sabotage from those outside

the LIO consensus, thus threatening the LIO itself (Farrell/Newman 2021).

Seeing world politics through the lens of WMPs suggests a slightly different tack that focuses not on the rise or fall of the liberal order (or of any single, monolithic order), but instead on the multiplicity of political visions jostling at any historical moment. Moreover, by examining how WMPs interact from the perspective of infrastructures, we can see more than simply competition between WMPs (the liberal internet versus the authoritarian internet, e.g.). We can also see phenomena including collaboration between WMPs – as in the interwar synergy between imperialism and internationalism examined in our interwar health communications case study – and the persistence of infrastructural questions across seemingly disparate political moments – as in our case study on satellite communications.

Looking at infrastructures does not offer a neat world-historical timeline of successive WMPs, in other words. Instead, it showcases the messiness of relations between WMPs, which can include both competition and cooperation. Infrastructure has served both as a site of contestation between WMPs and as an enabler of them.

This approach ties our work into the broader impulse in infrastructure and media studies to understand the path dependences of current infrastructures like the cloud (Holt 2024). Unlike that body of literature, our work integrates a slightly different set of disciplines, especially IR, sociology, and history. And in so doing, we suggest more complex ways to characterize the path dependency of infrastructure. Beyond simply tracing how prior infrastructures influence the present, we show how infrastructures can enable cooperation and competition, how hard it could be for emerging WMPs like anticolonialism to instantiate their ideas in infrastructure, and how ideas for worldmaking can collide with material realities.