Balloons

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First deployed in West Queensland, Australia, Alphabet's (formerly Google) Project Loon is flying balloons—essentially elevated cell phone towers—over Indonesia to provide internet to those who do not have it or cannot afford it. The Indonesian government is working with Alphabet as well as funding the start-up company Helion [http://insitekworld.com/helion] to make Indonesia a world leader in the use of balloons to deliver the internet. In this manner, the atmosphere becomes visible as an element where a "multiplicity of value regimes" exist, compete, or collaborate (Kjellberg et al. 2013: 19). We should ask ourselves whose political sovereignty is advanced through these different atmospheric technologies.

To progress Project Loon [https://www.youtube.com/watch?v=BEC0G2HbuiE], Alphabet has invested US 1 billion US dollars in research and deployment so that the company can sell internet services to the citizens of Australia, New Zealand, Sri Lanka, and now Indonesia. Some local information technology businesses in Indonesia believe that they are being excluded by Alphabet and their government from the ability to create economic value from their atmosphere (Jakarta Globe 2015). Many cultural geographers agree that the ability to make value from the atmosphere is unequally distributed (Vasudevan et al. 2008: 1645). Alphabet is "enclosing" (Philippopoulos -Mihalopoulos 2016: 151), "commercializing" (Shaw 2016: 21), or "colonizing" the sky (Crampton 2016: 137). Alphabet's method of privatisation is by being first to market, copyrighting technologies for bringing internet from the air, co-regulating with bureaucrats, and collecting important scientific information. To some theorists, the atmosphere above an area like Indonesia has become "a patchwork of more or less detached and controlled enclosures" (Klauser 2010: 332). In this enclosure, it is argued, an economic value that privileges wealth creation for international technology companies dominates. What is certain is that numerous values are created from the atmosphere by diverse communities, including international corporations and domestic business.

For local people, several problems emerge. First, Loon is a closed platform—Alphabet has filed numerous patents to protect its technical innovation—whose technologies are predominantly proprietary and therefore not transparent nor open for citizen understanding, critique, and adaptive re-use (Shapiro 2015). Second, Loon balloons are not controlled by citizens in Indonesia but rather by workers in Alphabet's global headquarters in Mountain View, California. The meteorological and network information procured in these experiments are not available for local use. Finally, this atmospheric privatization has occurred in Indonesia without local consultation about how best to open the atmosphere to multiple valuations and practices—something similar to a public common of shared resources and access. Instead, Alphabet established conducive relationships with Indonesian telecommunication companies and city governments so that Loon could extract value from the Indonesian atmosphere. A director of Telkom, a major telecommunications company in Indonesia, claims that "Google will bypass us", taking business away and profits

to a company located in the United States (Jakarta Globe 2015). Alphabet, however, believes it is creating social value by bridging the "digital divide" while also generating economic value for their stockholders through expanding their market. Cultural geographers claim that the proprietary and offshore nature of Loon can be interpreted as an enclosure and privatization of the atmosphere for large international business that excludes small business, local citizens, NGOs, and civil society (McCormack 2016). Some argue that privatization solves the problem of neglect of the commons (Hardin 1968). Others claim that communities, under the right conditions, self-regulate the commons (Ostrom et al. 1999). Today, there exists a pressing need to theoretically frame and practically build an "atmospheric commons" (Raymond 2016)—the concept that the atmosphere is a collective resource for a multitude of values.

Not to be out-maneuvered by multinational corporations and with venture capital investment from Indonesia's Ministry of Informatics, space technology start-up company Helion [https://www.youtube.com/watch?v=J278J6wUVi0] has developed a proprietary balloon-based platform that can provide internet access and remote sensing for lower elevations and in urban areas. Helion's balloons are literally tethered to the ground and thus symbolize the links of information infrastructure to emplacement, domestic uses, and local investment. By contrast, Loon is focused on data displacement, international deployment, and overseas investment. Whereas Loon's employees are based in America to where collected data flows, Helion employs local technologists and provides important technical and market data to the Bandung Institute of Technology. With different elevations, sensing technologies, mobilities, business aims, and relationships to the Indonesian people, Loon and Helion represent an increasing saturation of Indonesia's airspace with systems designed to extract economic value. Furthermore, both companies work closely with regulators to modify airspace regulations to maximize their gain. In this manner, the state of Indonesia, instead of creating an opportunity for transparency and inclusion, is using regulation and investment to assist major international technology companies and select domestic firms in atmospheric enclosure.

Not only galvanizing new business opportunities, these new entrants into the atmosphere have fueled "vertical" and "volumetric" theory-building in cultural geography (Adey 2010). There is a poorly understood "politics of verticality" involved in atmospheric engineering and regulation (Weizman 2002: 2). This includes the "uncertain legal status of the volumetric entanglement of stratosphere, high altitude platforms, ground-based infrastructures and territorially organized jurisdictions" (McCormack 2016: 13). While abstract theorising has been advantageous, what is required at this point are empirical case studies based on fieldwork of how atmospheric platforms—balloons, but also drones, small satellites, and the technologies of the emergent private space industry—are applied in and without the approval of specific geopolitical entities such as Indonesia. In the short space allotted here, I do not have time to examine data from this fieldwork but rather point to the research's theoretical potentials.

The differences between Alphabet and Helion in terms of reception and transmission technologies, working elevations, base station locations, regulations, funding relationships, software, hardware, target clients, technical practices warrant a nuanced and empirical understanding of value creation. Loon, for instance, is untethered, automatically and

algorithmically deciding on optimal navigation elevations, can cross national borders, and is a product of a multinational corporation. Helion, on the other hand, is tethered by cables to the Indonesian ground and funding base. Loon and Helion both run on proprietary software that limits user-innovation and community-involvement and is used for profitable ends. For both, the atmosphere is seen as a source of economic value—with informal claims that they also produce social value. This research on atmospheric platforms contributes to broader theories describing how the elements—earth, water, air—are and have always been conduits for value creation (McCormack 2016). This focus on the atmosphere contributes to these studies of "elemental infrastructure" (Starosielski 2015) and how the proliferation of sensors—on the Earth, in the oceans, and in the atmosphere—is creating planetary-scale computational systems (Bratton 2016, Gabrys 2016). Today's atmosphere is being reimagined by some technology companies as a "technosphere" (Shaw 2016: 3)—a commercial space governed by artificial intelligence that envelops the Earth's atmosphere.

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