

Extended Flight: The Emergence of Drone Sovereignty

Abstract

Concepts of technological autonomy and sovereignty circulate around unmanned aerial vehicles or drones. On the one hand, techno-utopians see drones as autonomous agents capable of extending and liberating the human sensory experience - most importantly sight - into the atmosphere. Conversely, techno-dystopians frame drones as sovereign killing and surveillance robots. This essay interrogates an experiment piloting a drone in southwest Iceland to collect video of artefacts surrounding undersea fibre-optic cables and cable stations. We had an experience wherein the drone usurped its autonomous connection to us as pilots and appeared to be temporarily sovereign. This field experiment complicates the binary outlined above, challenging the one-dimensional interpretations of the drone. In our framing, drones simultaneously extends human senses while informing a dread about technological sovereignty. In conclusion, we speculate on the problems and potentials of sovereignty and autonomy in networked assemblages and consider a situation where the human agent becomes potentially redundant.

Introduction

Landeyjarsandur, Iceland is a long expanse of black beach stretching down the southern coast of Iceland 1.5 hours southeast of Reykjavik. We took the journey to this place with two Icelandic internet engineers to make a film about how North Atlantic islands are linked by communication networks consisting of fibre-optical cables and cable stations. Landeyjarsandur's features are largely organic - even the remains of long-abandoned fishing boats and washed up cultural objects seem to have long folded themselves into the environmental matrix. One feature remains distinct however: a small well-fortified building that houses the submarine communications cable landing point between Denmark and Greenland. Part of our methodology was to deploy drones with high-quality video cameras to follow the cables from the air. However, in taking to the air, we experienced a methodological disjunction, a moment when our expectations and desires as pilots were outstripped by an event. This article, and the accompanying film, is about a situation where our previous experience of autonomy in relationship to the drone--that it listened to us and followed our direction--was replaced, however temporarily, by drone sovereignty, wherein it appeared to have agency in the atmosphere.

The Atmospheric Element

Solid, liquid, and gaseous chemicals that originate in the earth, on its crust, and float in the air also flow through us, constituting everything from our bodies to our most complex technologies. The information infrastructure that connects 3.2 billion people on this planet are made from the hard matter of computers, cables, and buildings and also the less tangible--coded electrons racing through copper, light flashing through fibre-optic cables, and microwaves relaying data from space satellites to terrestrial dishes. We could think of information in terms of an alchemical taxonomy of elements: water, air, earth, and perhaps fire-as-light, something other scholars in media studies have done.¹ The hard earth is mined for trace elements for phones, radio populates

¹ Parikka, Jussi, *What is Media Archaeology?* (London: Polity, 2012).

bands of atmospheric elevations, and fire-bred light manifests in fibre-optical cables that criss cross the ocean floors.

Of all of the elements, the atmosphere has been most intensely examined by cultural geographers and technology corporations (such as Google, Virgin, SpaceX, Facebook) looking for spaces to commoditize.² Once gravity is temporarily suspended via propellers, helium, parachutes, gliders, heated carbon dioxide and jet engines, the atmosphere becomes amenable for human engagement. Air is the least resistant and most hospitable of the non-earth elements - less dense and hot than places where deep earth minerals are extracted and less challenging to negotiate than the liquidized oxygen of the ocean.

The atmosphere works not merely as a terra incognita for potential *conduits* - a miner's tunnel, a tidal channel, or a cable that funnels information in a direction - but also as a *conductor* for human and non-human forces. The atmosphere draws differently on the imagination, partially because it exists outside of function and profit; it is neither a resource base nor an easily inhabitable space. But for those prepared with the necessary technologies, the atmosphere is a conducive force that makes specific outcomes possible. There is nothing immaterial about the atmosphere and complex material technologies are needed to engage with the atmospherically possible. Atmospheric materiality and the hard technologies of sight, light, and wave communication merge to mediate themselves. In this manner, the atmosphere is an infrastructure for the transmission and reception of information. Adding drones to this matrix increases atmospheric spaces of possibility.

One can work and play with the air. Kites, helium tanks, and balloons can be bought inexpensively. The artist Tomás Saraceno has long experimented with transforming objects such as grocery store carrier bags into atmospheric things.³ But only after significant human investment and investigation do atmospheric infrastructures reveal their deeper elemental conductivity. Human space and air travel infrastructure is costly. Middle-class incomes are required to purchase and use high-quality amateur drones like those we used in the field. While the atmosphere is the least friction-ful of the elements, entering into it requires money and therefore is influenced by power - both economic and political. Extractive industries work day and night in the earth and sea, with mines, platforms, and rigs - and even the Earth's atmosphere is extracted for Hydrogen, Helium, and methane. NASA scientists have investigated the atmospheric mining of fusion fuels like Helium 3 from Uranus and Neptune to fuel jets, balloons, rockets, and other UAVs--which could extend their extractive worth indefinitely due to

² Peter Adey *Aerial Life: Mobilities, Spaces, Affects* (London: Wiley-Blackwell, 2010); Jeremy Crampton "Assemblage of the Vertical: Commercial Drones and Algorithmic Life", *Geographica Helvetica*, 71, 137-146. Stephen Graham, *Vertical* (London: Verso, 2016); Derek McCormack "Elemental Infrastructures for atmospheric media" *Environment and Planning D: Society and Space* 2016: 1-20; Lisa Parks "Mapping orbit: Toward a vertical public space", in Chris Berry, Janet Harbord, & Rachel Moore (Eds.), *Public space, media space*. NY: Palgrave Macmillan, 2013); Ian Shaw, "The Great War of Enclosure: Securing the Skies", *Antipode* 2016 0(0), 1-24.

³ Englemann, S., Derek McCormack and Bronislaw Szerszynski. 2015. "Becoming Aerosolar and the Politics of Elemental Association" in *Tomás Saraceno: Becoming Aerosolar*, (21er Haus, Vienna: 2015).

the process of self-fueling while orchestrating the Earth-bound return of the gas.⁴ This interplanetary human ecology of technologies and elements is both of this earth and beyond it. Its investigation requires significant political and financial power but small scale studies with significant impacts can be achieved.

While artistic and extractive applications of atmospheric technologies are important it is the violent applications of drones that concerns many. Drones further the transformation of the battlefield in a three-dimensional volume. Add to the drone's ability to fly and hover for days, its distant remote control, visual acuity, and devastating payload, and the drone becomes an impressive weapon. The uncanny qualities of drones has people imagining a future in which drones and other robot-like such as self-driving cars and anthropoid cyborgs free themselves from an autonomy shackled to the human controllers. Imagining drones transforming from a tethered autonomy to a liberated sovereignty can be inspired by envisioning the application of the drones, face recognition software, and the "kill list" - a US Presidential litany of terror suspects who can be immediately terminated upon sight without further approval.⁵ Today, the drone - both military grade and the over-the-counter versions we fly - are autonomous. They can act but only within parameters assigned by the human agent who is its sovereign. The terror, however, is the potential for the drone - aided by big data, powerful sensors, relaxed regulations - to become sovereign: free to move and act with little human oversight. In the next section, we interrogate this tension.

[[INSERT VIDEO HERE]]

The Bodywork of Droning

As depicted in the video above, our drone sped away from the Landeyjarsandur cable station at an alarming speed and seemed to willfully ignore the 500 meter distance limitation that is programmed into the software by the manufacturer. This fixture can be manually adjusted but for the weeks and hours of flight before we retained the pre-setting. In this instance, instead of warning us that it had reached its limit and would be soon returning autonomously to its point of departure, the drone continued to trace the undersea cable beyond the expanse of sand and out to sea. This was a liberating experience for us, the drone's pilots, but also terrifying.⁶ The euphoria was eventually truncated by a conservative concern that we would lose the drone in the North Atlantic. So we turned the drone around and brought it back to shore, retracing the hay bales which formed a distinct line in the sand back to us and the cable station. Our attempts to direct it were quickly usurped as the drone automatically attempted to return to its home spot. But the drone's experiment in temporary untethered sovereignty had drained its battery before it reached us and it started a descent - not a fall but a quick and careful descent as the four propellers spent

⁴ Bryan Palaszewski, *Atmospheric Mining in the Outer Solar System: Aerial Vehicle Reconnaissance and Exploration Options* (Los Angeles: NASA, 2014)

<https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20140017392.pdf>

⁵ Natalie O'Neill, Better Facial Recognition Tech Could Lead to Robot Hitmen (Motherboard)

https://motherboard.vice.com/en_us/article/facial-recognition-robot-hitmen

⁶ We are not the only pilots to experience unshackled flight. In 2017, the United States Navy had a \$1.5m Shadow RQ-7 drone take an "unplanned 623-mile excursion"

https://www.theregister.co.uk/2017/03/02/us_military_drone_crashes_623_miles_away/

their last spins to drop the drone in one of the grass patches growing out of the hay bales that covered the internet cables running between station and ocean.

Coming down from our scared, confused, and euphoric high, we asked why did the drone do this? Was this extended flight at Landeyjarsandur a failure or an opening? As urbanist Stephen Graham writes, "...moments of stasis and disrupted flow [can be] a powerful means of revealing the politics of the normal circulations of globalizing urban life."⁷ Perhaps it was the topographical spread of the black sand beach, the conductivity of the basalt in the black sand, or perhaps it had something to do with the way the drone and the electromagnetic field of the cable landing site interacted. This is all speculation, but it was one of the first experiences we had of seemingly limitless extensionality - to the point where the drone got away from us. It has exhilarating and terrifying, losing control of a valuable aircraft.

Not wanting to wreck any additional drones, we had grown wary and safe in our piloting, keeping the drone near our bodies, within "line-of-sight", only following straight lines, creating clean transects of striated airspace. The limits of the technology, as we perceived them, came to condition us. We were accustomed to receiving aural and textual warnings on the iPad announcing we had arrived at maximum horizontal communication distance, or, worse, receiving glitched-out communications and loss of the video feed entirely. As described above, a loss of signal triggered the drone's automatic "return home" function, a disconcerting experience as the machine intelligence overrode human agency and the drone ostensibly returned to the spot from which it lifted off. In actuality, these moments, rather than making the pilot feel at ease in the hands of the superior machine awareness, often causes great anxiety when the drone flirts with banging into a building, tree, pylon, rock outcrop, or bush "near" the home point where it inevitably tips over and digs its blades into the Earth, spasming around, willfully breaking its fragile components.

Drone technology, novel as it is, is quickly being rolled out into shops around the world. Our experiences and commentary on user-forums, show that drone hardware, software, and firmware is buggy and flying is more challenging than it looks in corporate trailers. Defying our expectations then, the drone appeared to act on its own, transgressively. It confounded us, causing our pulse to race. In this manner, the drone enabled a new-type of contested and speculative vision, a mysterious and uncanny action/reaction feedback loop. As philosopher Ian Bogost suggests, "Anyone who has ever had to . . . operate . . . a computational apparatus knows that a strange and unique world does stir within such a device. A tiny private universe rattles behind its . . . exoskeleton."⁸ From our perspective, the drone's "tiny private universe" is briefly accessed through moments of breakage such as what we experienced in Iceland. For the drone, however, these moments of failure are instances of freedom. For the human pilots, drone freedom confirms fears that a sovereign force has awoken, one that no longer needs or has patience for its human creators. Must we design failure into technologies like drones so that we humans remain sovereigns?

⁷ Stephen Graham, *Disrupted Cities: When Infrastructures Fail* (London, Routledge, 2009), 3.

⁸ Ian Bogost *Alien Phenomenology, or What It's Like to Be a Thing*. (Minneapolis, MN: University of Minnesota Press, 2012), 9.

These euphorias, worries, and reveries occurred to us in but a few brief seconds. We did not know where the drone was. We could still see through the drone's ambulatory eye and move it up and down as if trying to rise up to see above the tall grass to flag down its pilots. We looked for a half-hour in the deserted beach expanse, behind discarded fuel canisters, in tufts of grass growing from the hay bales covering the fibre-optic cable and over the ridges of ceaselessly-reforming dunes.

Exhausting our options, we refocused on the tall clumps of angular grass. We found it just before its battery died and its eye closed. We were only partially culpable when we found its motors and gimbal destroyed, grains of fine sand ground into its exposed gears. Here, the drone died, digging a little grave for itself with its spinning propellers, seeming to continue to follow the fibre-optical cable under the terrestrial sand.

During the Landeysjarsandur flight, the drone seemed to shed its mooring and become sovereign. For a sovereign state to exist (whether territorial or extraterritorial), freedom must be self-determined and therefore not descended from a central authority. The sovereign *is* the central authority. For autonomy, freedom exists but is limited by an external sovereign force. Autonomous agents are linked to a distant authority. These definitions provide leverage for theorizing drones with different degrees of linkages to sovereign forces. As Bruno Latour suggests "When a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more . . . tech- nolog[ies] succeed, the more opaque and obscure they become."⁹ The failure of the drone to perform as expected created a heightened awareness, extended sensorium, and increased terror.

As John Urry writes, all aerial technology, while autonomous, is also tethered or "moored" to an infrastructure on the ground, disrupting the illusion of the "unmanned autonomous vehicle", a phrase many consider synonymous with the drone.¹⁰ This seems laughable to those of us who fly drones and understand the twin limitations of battery length and tethering. Drones are not unmanned and are autonomous within previously defined parameters imposed by human intention, environmental elements including the air, sand, and sea and their relationship to other objects. When these machines break through these barriers, however, and achieve what appears to us to be a degree of sovereignty (what might also be called machine intelligence or even artificial intelligence), the object becomes ever so slightly monstrous.

Conclusion

Landeyjarsandur became an unexpected site of experimentation for us, the first place where we began to experience the possibility of an emergence drone sovereignty. We inadvertently used a drone to find the meeting point where utopian corporeal extensions-of-the-self and dystopian dread about sovereign robots. The meeting point was our piloting human body, a waypoint for affect in a line-of-flight between a drone, a beach, and a internet cable landing station. The

⁹ Bruno Latour *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press), 304.

¹⁰ John Urry, *Global complexity* (Cambridge: Polity 2003), 138.

sovereign drone, untethered from the sovereign human, is eerie, unsettling and ultimately terrible because we have not yet developed the social and legal frameworks to cope with machine sovereignty. As a result, in every flight, the place of the pilot is paramount. However, as we found at Landeyjarsandur, even a pilot's capacity for freedom may be stretched beyond measure, pulled into a new sensory assemblage by a wilful machine that seems poised to exceed.