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The Sensing I/Eye: Bringing The Drone Down To Earth

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ABSTRACT

This paper draws from art, activism, and other critical practices to examine the question of whether one can speak of an aesthetics of drones, or indeed what sensory registers even make knowledge of drones possible. Given that drones themselves are typically sensing devices that depend for their functionality on remaining obscured, a variety of practices are required for understanding how drones operate as instruments of political and social life.

INTRODUCTION

Although diversely constituted across a wide array of practices including but not limited to photography, film, performance, installation, geo-locative mapping, and sound art, drone art often foregrounds issues of presence/absence, visibility/invisibility, among other sensory and psychological oscillations, or the destabilization or "un-fixing" of perspective resulting from the multiplicity of sensing devices and the datafication of vision performed by sensing, gathering, and transmission of data, and its subsequent reconstitution into images.

Drone aesthetics investigate the construction of technologized ocular regimes governed by remote sensing and aerial visuality. From one angle, the materiality and mythology of the drone are approached from an extrinsic perspective, focusing on human observation of the drone, and the reverse condition–when in the act of looking or searching, we also become subject to observation from above. Painter Kathryn Brimblecombe-Fox describes the conceptual framework underlying her series of paintings entitled *Dronescapes* thusly:

> "[P]eople, who live in places where drone surveillance and potential attack are persistent threats, are afraid of the sky - often too fearful to venture outside. I wonder about what kind of world we are living in, where on the one hand cosmological research delves into the vastness of the universe, but on the other hand some people are afraid to look up at the sky." [1]

We see, or fail to see, and are concomitantly seen, and potentially targeted.

Drones are instruments that are both known and visible (they sometimes can be seen overhead), and unknown and invisible. Trevor Paglen, a researcher, artist and writer, is known widely for his

photographic investigations of the land and skyscapes of the post 9/11 U.S. military-industrial complex, exemplified by hidden military bases and test sites, and of course by the numerous "black ops" conducted with drone technology. Commenting about the recent history of drone deployment, he recalls that as early as 2003, "if you were driving through Nevada you would sometimes see them." However, "that base is on complete lockdown now." [2] The early visibility of the technology has been suppressed, and drone operations have become increasingly covert.

Just as technology precipitates tectonic shifts in existing scientific paradigms, epistemologies, and scopic regimes, Paglen forecloses idealism by aiming his camera from the outside in. When the drone becomes the object to be seen, not the agent of seeing, it retreats into shadow–evidence of its presence most often indicated by sound or by the wreckage left when it falls from the sky–finally not such a reliable technology after all, its systems subject to glitches, not unlike human error. As an example of drone-sighting, rather than drone sightedness (and the homology, or lack thereof, between human and drone seeing), Paglen's work takes the extrinsic approach (looking from the outside) to drone aesthetics to the extreme, pushing the image past legibility. In capturing "what it looks like when your physical capacity to see collapses," he continues to remind his viewer of "thereness"–the certainty of "thereness," whether or not it is legible to the eye, through the lens. Drone sightings, however partial or unsatisfied, allow the agency of the human viewer and "seeing" itself to remain relatively unproblematized.

In another modality of drone aesthetics, the viewer is released from her vulnerability; no longer targeted, she is incorporated into the act of targeting. When seeing and sightedness are framed in the context of drone-mounted recording devices, broader philosophical questions arise regarding, for example, point-of-view or the aesthetic characteristics of flight recordings. This model of drone visuality re-orients (or perhaps disorients) the viewer, positioning her within the drone, inviting convergence of the viewer's visual cortex and drone's sensors. Whether visual convergence is accepted or rejected, the internal situatedness of the viewer provokes a confrontation with the very idea of "seeing." First-person viewing of images recorded by drones not only undermines traditional perspective and orientation, but also introduces the notion of drone anthropomorphism, which brings to bear the numerous philosophical issues underlying the notions of human and drone "seeing," "autonomy" and "intelligence." Here, the human subject and the drone look out into the world in unison. But how closely does the activation of sensors for the purpose of collecting data approximate human visual information-gathering? Is this linguistic homology merely a false friend, and the analogy between sightedness and sensory apparatus of the drone a vivid but insubstantial metaphor?

While drone art nominally confines itself to a seemingly narrow range of technical specifications, "[w]hat we believe to be a straightforward narrative of invention is really multiple inventions that collapse into a single unit, with competing designs that coexist for a time, with the intended use of a technology supplemented by a completely different, unexpected use." [3] Thomas Stubblefield has addressed the ethical complications of faithful adherence to "subversion" suggesting that this stance presupposes the progressive potential of intervention from the outside through such strategies as detournement, appropriation, repurposing, or remixing. Is it possible to place drone art under the umbrella of "activist art"?

Stubblefield contends that drone artists frequently "eschew the distance of critique, seeking instead to initiate blockages and intensify existing relations." [4] Beginning with the idea that "there is no

longer any outside to capitalism [and by extension, its mechanisms of warfare]…the primary way to derail its inner workings is by amplifying its own powers for deformation and self-destruction." [5] In so doing, these artists employ a strategy of immersion instead of distance, engaging as directly as possible, with the mechanisms and properties of drone "seeing," and consequently, how drone visuality participates in the construction of a world picture extending far beyond the boundaries of the military-industrial complex and into the public domain.

DRONE AESTHETICS

Drones provide ample fodder for artistic inquiry into the ramifications of drone technology in a wide array of contexts. To speak in terms of drone "aesthetics" might seem to tread onto dangerous ground–the aestheticization of war and acts of violence. If aesthetics is peeled from its too-narrow affiliation with judgments of taste and beauty, its critical and theoretical potentiality broadens significantly. Reconstituted etymologically, aesthetics is coextensive with sensory apprehension, or the processing of sense perception. Framed in this context, drone aesthetics are concerned with sensing–sensing the drone from below, or embodying and taking on the sensory modality of the drone.

As an instrument of warfare, the drone's existence is inextricably tied to material destruction. But its role in covert operations necessitates its effacement, its dematerialization and relegation to the shadowlands. "The drone exists, taking to the skies above our heads every day. But it also doesn't exist, because it is shrouded in fantasy." [6] It is in the continuous shifting between existence and non-existence that the aesthetic potential of drone art is most apparent. "Most people by now have a picture in their mind's eye of the drones themselves. The silver-gray planes have a signature bulbous nose and inverted V tail fins, while the planes' lack of windows lends them an eerie air of sealed-off blindness." [7]

The public has some idea of their presence, but they become shadows of themselves, seemingly immaterial because they go unnoticed. In *Drone Shadow*, James Bridle etches chalk outlines of drones on the ground similar to those inscribed around the bodies of murder victims by law enforcement, but at a scale too large to resolve into a coherent image unless viewed from an aerial perspective. "[T]he drone appears as an incomplete object in Bridle's work, a shadow that is in expectation of future activation via the image and the network." [8] Drones' functionality depends on the continuous maintenance of a feedback loop between drone and controller, or more often a network of controllers. This project sketches the outline of an imagined shadow of a hovering drone, calling attention to the having-been or yet-to-be manifest the physical presence of drones in the skies above, as well as our propensity to ignore or simply not perceive signs of that presence. Drones circulate in the shadows, both literally and metaphorically. For example, as surveilled subjects, we "live under the shadow of the drone," but approximations of drone sightings occur in the "accidental drone shadows captured by Google mapping satellites." [9]

In the introduction to an interview with Paglen at Bard College's Center for the Study of the Drone, Lenny Simon's description of Paglen's drone photography aptly demonstrates an external, observation-based approach to drone aesthetics, centering on the dialectic between presence and absence, visibility and invisibility, knowledge and its obfuscation:

> [Paglen's] interest in 'the line that separates vision from knowledge' led him, inevitably, to drones. Paglen's photographs of drones have become canonical. One image in particular, a blurred photograph of a Reaper drone at an Air Base in Indian Springs, Nevada, captures exactly what it is about drones which has taken such a firm hold of our imaginations. Although the image is extremely distorted, the hulking Reaper is immediately recognizable as a drone. By creating an image of a drone that is highly obscured and abstracted, and yet eminently recognizable, Paglen has represented the space that drones inhabit in the public imagination. Paglen has also pointed his telescopic camera lens at government drones in mid-flight; in the resulting images, the drones appear as tiny specks in the sky, further highlighting the tension between their outsize presence in mass media and the fact that they are rarely, if ever, physically seen. But Paglen's interest in drones extends beyond the aesthetic paradox that they present. He maintains that his work is 'not so much trying to fill in these metaphorical blank spots as it is trying to understand how they're produced and what sort of state capacities and powers have to be developed in order to create and sustain such a system.' [10]

Drones are rarely seen, sometimes heard, always at the margin or beyond the periphery of apprehension. They are revealed merely as Paglen's "tiny specks" or as the shadows accidentally captured on Google maps invoked by Bridle's *Drone Shadow* project. Instead of satisfying the imagination with finely-resolved, high-dimension images, Paglen's images remain indistinct. Sight, then, is reduced to the glimpse. Drone aesthetics are characterized by incompleteness–little to no information is garnered from shadows or specks.

THE HUM OF PRESENCE

Appraisal of drone aesthetics need not be limited to visual, optical, or scopic regimes. Tactility and haptics, proximity and intimacy are as much at issue as remoteness. The fact that the drone gathers information by sensing invokes a range of possible investigations–for example, experiences of intimacy and invasion precipitated by remote sensing–into the phenomenology, cultural mythology, and politics of drones and remote sensing technology. Although drones are largely imagined as technologies that extend the human threshold of visibility, many drone artists appropriate auditory phenomena potentiated by drones. If there is a phenomenology of drones, it is most strongly borne out by sound. The absence or presence of a drone, and its physical proximity, is ascertained aurally, the ear functioning as the organic "sensor" corresponding to the sensing device on the drone.

But this fear of looking is often precipitated by sound, rather than visual perception. "The first one flew overhead humming, followed by another…then another and then…the sky was a singing swarm. Were they flocking? Could this become more than a mere experiment?" [11] Numerous studies have "gathered substantial evidence regarding the psychological toll exacted by living with this presence of the drone. A young father told interviewers that the drones 'are always on my mind. It makes it difficult to sleep. They are like a mosquito. Even when you don't see them, you can hear them, you know they there.'" [12] In this case and countless others, the certainty that you are always watched is no delusion or wartime-induced paranoia. It is a fact, ascertained by the sound of the drones hovering overhead. Drones are not silent predators; as weapons or spying mechanisms, they inflict more than physical trauma. To those living not only under the shadow of the drone but within the range of its sonic resonance, drones are never absent.

Simon Remiszewski's *Drone Conditioning* presents the sound of drones far more literally. In this case, the sound produced by the drone is not generated by outside data or *detourned* towards an abstract musicality. As drones fly above Pakistan and Yemen, inhabitants experience the ever-present buzzing of the devices overhead. They are both terrified by the sound and become conditioned to it, perhaps becoming accustomed to a life of fear. Remiszewski's intervention brings the drone home to the U.S., asking U.S. citizens to place themselves within the experiential threshold of the distant and often faceless 'other' constructed within the popular imagination. Riemiszewski brings attention to the perpetration of violence by the unmanned vehicles to those who might rather ignore it. In his artist's statement, Riemiszewski invokes the power of satire, turning a potentially acerbic critique towards humor. "By introducing you and your loved ones to the sound of the drone long before they're hovering above your neighborhood, you can preemptively eliminate such stress and anxiety!" [13] This ironic tone serves to dispel a purely fearful reaction to the buzzing sound of overhead drones, instead provoking a more reflective view not only of the outright destruction perpetrated by drone technology, but also its more subtle effects.

In Richard Johnston's music video for the song *Weightless*, physical actuation of audio signals on the body (specifically reduction of stress and heart rate) are augmented by the creation of a visual component–an abstract video compiled using drone technology in which the flight of the drone creates a three-dimensional choreography (which the artist calls a dance) to illustrate the movements within the song. In a project exploring the generation of sound through movement (instead of the generation of visual movement (by sound), Maria Judova's *Composition for the Drone* transforms the drone into a sonifying instrument by collecting data and converting it into sound.

Nevertheless, drone artists utilizing sound, for example, must also navigate the terrain of data visualization and the prevalence of rendering data legible through images. Rothstein notes that "there is one feature we see in almost every situation–the presence of a camera." [14] The production of images by drone-mounted cameras and other remote sensing technologies, including video, radar, infrared, and thermal imaging, manifest different "ways of seeing" that seem to undercut the primacy of the image, now reconceived as mere output of data-processing. "The Predator and Reaper drones used in U.S. counterterrorism and targeted killings are equipped with infrared sensors…. Once this radiation is detected, it is encrypted and converted into data and transmitted to earth stations where it can be processed by computers and rendered as rasterized displays that correlate pixel qualities with temperature values." [15] To align thermal imaging with a way of seeing also compels us to reconsider or redefine the image: What constitutes an image? Does the identity, or definition, of the image shift when its substrate is invisible to the human eye, translated into visual legibility through collection, processing, transmitting, and rendering data?

Interrogating the visual world of the drone–how it sees and what it sees–reveals the network of power relations in which the drone travels and on which its existence is predicated. Drones, as remote sensing devices, have become the contemporary icon of dataveillance; as in traditional modes of surveillance, they observe and monitor their mark from a distance, but their process of detection, datafies the surveyed subject–observation transforms into data collection, processing, and storage. Drones rely for their survival on a ceaseless autopoetic feedback loop of data collection and transmission. "They fly through the air, but they are only able to do so because they have sensors constantly collecting data, which is then fed back to the algorithms helping to control

the aircraft for the operator." [16] First and foremost, then, drones exist as aerial data collecting "agents." If the system ceases to gather data, it fails in its data-gathering "mission." This failure to execute data-delivery renders the drone non-operational; a system crash is quickly followed by a physical crash-and-burn.

NETWORKED CONTROL

Remote sensing technology steps toward a reconfiguration of what it means to see, and toward the formation a new visual paradigm. While McLuhan theorizes technology as a prosthetic extension of man, the prosthetic device is notionally singular, extending the capacities of a singular subject. Remote sensing operates at a further remove from McLuhan's technological prosthetic, unfolding into the dynamic multiplicity of the network. The drone, in James Bridle's words, is a "prosthetic of the network" in which "certain forms of warfare" are precipitated, or at least facilitated, not by the drone as an individuated entity but by the fundamentally networked conditions on which its functionality depends. [17]

Drones, then, are located in a field of networked technologies including the Internet; they perform as one set of "eyes" of the network of satellite imagery and communications, as a contributor to the constantly aggregating mass of Big Data as well as the proliferation of coding/programming. Bridle has concurred with this estimation, stating that "one way of looking at drones is as a natural extension of the internet in terms of allowing sight and vision at a distance. They're avatars of the network for me." [18] Drones function as nodes in a network of location-aware surveillance technologies that are guided by and deliver information about their activities via satellite. They are instructed to attack if their compiled data identifies an eliminable target, but outside of the military, no one knows exactly how information is gathered about or determines targets.

Moreover, as Nadav Assor has remarked, drones are constructed not as a singular technological entity, but rather as a conglomerate of individual mechanisms including code, motors, mechanics, and electronics. "We use metrics, fed back to us from our devices, in order to make decisions on whether or not to continue using that technology." [19] Both in their individual physical makeup and in relation to one another, they act across a wide distribution of internal and external linkages, collecting, processing, and transmitting the data that is fed back into the algorithms instructing them to engage the target that it initially identified.

Unmanned Aerial Vehicles–the name immediately conjures a science-fictive future in which machines have replaced the need for soldiers in the field, possibly a world in which systems have become truly autonomous, no longer relying on (error-prone) human actors to shout commands from a dangerously proximate hilltop. We have entered the age of unending war waged covertly and remotely. The drone's directive to sense from a distance and its "unmanned autonomy" add a particular form of terror to the physical havoc it ultimately wreaks. However, the political and military-industrial complex is far from eliminating human decision-making, specifically the decision to fire, from drone warfare in favor of wholesale automation. Maintaining the authority of a human controller, or many controllers, to initiate tactical engagement, contravenes against the fantasy of fully autonomous weaponized drones.

In his reflection upon the fear and fascination engendered by the drone, its pride of place in a symbolic hierarchy of automated weaponry, Rothstein hypothesizes that "it is more about the idea

that choosing whether or not to fire is a decision that *could* be automated." [20] However, picturing a one-to-one relationship between a drone controller at the trigger and a drone ready to fire on command would be a misapprehension. It becomes quickly apparent that the continuous functionality of the drone relies upon more than a single feedback loop between two actors, because the drone is only one actor in an extended network that constitutes the "kill-chain." [21] As the Predator drone used by the U.S. military "requires around 185 personnel to operate, this expansive network does not simply remove the operator from the vehicle but rather intertwines its operation with a dispersed collectivity." [22]

From this point of view, claiming that drone technology effects a radical shift in contemporary visuality might lose momentum given that any reframing of what constitutes sight and seeing, any destabilization of perspective, vantage point, or point of view are in fact an epiphenomenon of the drone's primary task: the collection and transmission of data, *tout court*. Nonetheless, the "convergence between the operation of the drone and image production" does point to a laying-bare of representational techniques/technologies, as well as theories of representation itself, that have achieved transparency in Western visuality." [22] "Utilizing edge detection, motion capture, auto-tagging, and facial recognition, drones supplant the perspectival, Albertian image with a catalog of distances, volumes, heat signatures, and behavioral patterns." [23]

Trevor Paglen has, throughout his career to date, emphasized consistently the aesthetic and conceptual significance of obscurity in his practice; that which is obscured is notionally present, it shies away from absence or nothingness, despite its unavailability to sense perception. His images thus stake their claim on the proposition of "thereness." But after pointing "there," the image abruptly ceases to divulge further sensory data, offering up a nearly featureless surface of textures that refuses to impart knowledge or understanding. Traces of visual information haunt some of his images, but the resolution of the photograph is fixed, frustratingly, just before the point of visual resolution.

GLITCH/FAILURE AS CRITICAL STRATEGY

As we have seen, Trevor Paglen ties his photographic aesthetics to his theory of the limit-case of vision. "The images are taken from so far away, through so much dust and haze and heat, that while it's a photograph of a site, it's also a photograph of what it looks like when you've pushed the physical properties of vision as far as they will go. It's a photograph of a place, but it's literally a photograph of what it looks like when your physical capacity to see collapses, or begins to collapse." [24] According to the traditional standards of "successful" photography, in which the subject is captured with clarity, repleteness of detail, and density of "evidentiary material, these would be classified as failed" attempts.

Seemingly contradictory attitudes toward drones exist even within the military institutions in which they are deployed. The co-existence of, on the one hand, fantasies of increased efficiency and elimination of human error in automated weapons technology, and on the other, fear of total automation, are immediately and urgently manifested in high failure rates, not of human operators, but of drones themselves. Contrary to the notion that human error decreases proportionally to its replacement by autonomous or semi-autonomous systems, drones remain, as we have seen in the military's refusal to invest drones with automatic firing capability, quite intentionally subject to human command and control. Furthermore, the "co-constitution of 'drone' and 'human'" that has

occupied the discursive center of the development of drone technology, from post-WWII experiments to the present, is haunted by the specter of mental, not merely technological breakdown. [25] Peter Asaro's research on the topic reveals that despite attempts to decrease inefficiencies in drone operators, "[o]ne of the primary accounts of stress…involves the relationship between human operators and the technological interfaces with which they must interact…that are frequently subject to malfunctions." [26]

Guarding against false idolization of automated drone weaponry, drone artists have taken up the strategy, adopted by the broader (rather amorphous) community of new media artists, of appropriating and exploiting the 'glitch' as a critical practice. By making art that points to or performs the inevitability of systemic glitches in allegedly reliable, if not failsafe drone technology, drone artists debunk the (prophylactic) illusion of hyper-advanced military technology.

The myriad possibilities inherent in drone technology could, and might, result in an expansion of its utility beyond covert and overt acts (see, for example, recent Amazon commercials for drone-delivered packages) of (declared or undeclared) war. However, drones built for and used in the private sector often mimic and fetishize the military operations for which drone technology was developed, more firmly embedding the drone as a dominant trope in a culture of fear–specifically, a fear of the unpredictable devastation ostensibly unique to "acts of terrorism." Drone artists have, often adding lightheartedness to acts of protest, utilized failure and the glitch to propose alternative uses of the drone in art, to contest the seeming inviolability of the drone, and to undercut its symbolic entanglement with fear and acts of terror.

In the private sector, glitches, while annoying, inconvenient, and sometimes personally disastrous, are regarded as an unavoidable byproduct of technological development. Lee Montgomery's experiments with the Parrot.AR drone and Greg Riestenberg's with the SCOTUS drone perform calls to awareness of the reality of catastrophic crashes in military drones. In a moment of serendipitous failure, Suzanne Treister was forced to buy a new drone when her first crashed during the opening for her piece the *Drone That Filmed the Opening of its Own Exhibition*.

In its military application, the malfunction of the drone, instantiated by the crash, is also the very thing that establishes its existence and renders it visible. The crash disrupts the capacity of the drone to control a territory through, first, disembodied vision and second, the brutal deployment of firepower. A particularly well-known piece that not only presents the phenomenon of the drone crash but also, more importantly, addressed the social and institutional responses to collisions in public sphere with drones themselves and their symbolic valences. Ricardo Dominguez, Ian Alan Paul and Jane Stevens' *Drone Crash Incident*, staged on the UC San Diego campus, was conceived "as a form of critical fiction or disturbance theater." [27] The tenor and force of the reactions to the "crash" varied, unsurprisingly, from accounts to account, from initial publicization to subsequent investigations and reports within and outside the University.

The artists created and distributed "hard evidence" of the drone's existence, including press releases, documents, photographs, and other communication mechanisms as a clever "cover-up" for the fact that the crash was entirely staged. "I'm sure some of [the students] probably did think it was real," Dominguez said of the drone crash, "but that's one of the practices of new media art—what we call a minor simulation. It creates an event that is difficult to understand as either real or non-real." [28] The status of the crash as simulation rather than actuality did not fail to produce

responses amongst officials within the University of California system, frequently citing the unlikelihood of drone malfunction, while also offering classes in "drone safety." Dominguez contends that, in the end, while he "is concerned about the use of drones and how it may impact people's privacy,[…]the staged drone crash is more of a conversation-starter than a protest piece." [29]

REMOTE SENSING BEYOND THE DRONE

Paglen's work with drones constitutes only one small part of his research and practice concerning the physiological threshold of human vision and its epistemologically circumscribed limit-cases. In the cultural imagination, the view from above, the vantage point of aerial remote sensing technology, is most closely associated with satellite technology. "Our contemporary view of the world is actually and conceptually constituted, to a great extent, from the vantage point of satellites in orbit around our planet." [30]

Clearly, the viewpoint of drones, their perspective on the terrain they survey, cannot begin to approach the capacity of satellites, and thus the perception of their visual mastery. Notwithstanding the attachment of descriptive terminology of the "God's eye view" variety to drone vision, satellites and drones fulfill radically different functions, despite their classification as remote sensing technologies. "To the degree that digital satellites seem to directly picture the Earth as a globe, they conceal a visual regime that would assert the global as a particular way of picturing the world: a "global perspective" put forth less as a politically and technologically mediated representation than as a real, objective, and transparent manifestation of the world itself." [31]

Unlike satellites, drones do not construct a "global" scopic regime of totalized visibility. As vehicles whose existence is predicated on their ability to amass data, drones are fundamentally in process, and as such, characterized by partiality. Satellites, likewise, continuously aggregate, process, and transmit data, but their "global perspective" implies both totality and scopic mastery. The "global" view aggregated from satellite data strips locality and situatedness (both highly significant to drone vision, if unfortunately utilized for the purposes of targeting). A global perspective implies not only the overall or total image of the earth itself, but both macro- and microscopic visibility, in which the data compiled in the overall image reveals its density in the zoom, the plunge towards the earth's surface that reveals further and further degrees of fineness as the image refreshes. The complex technological mediation underlying the production of satellite imagery is both tacitly acknowledged but unproblematized–satellite imagery (when we conveniently forget or ignore the darker implications of its military operations) has, in its everyday application (e.g. for daily navigation), enfolded into quotidian life.

This diversion into an analysis of satellite imagery provides a counterpoint to the model of drone visuality and "seeing"–the scopic regime it simultaneously engenders and inhabits–that I have proposed here. Notionally, satellites orbit in a qualitatively and quantitatively (phenomenologically) unknown space. Satellites do not occupy the "Space," say, of *Star Wars*, the Space which has become both an inhabited place and a proper name. Exceeding the range of knowability, they are projected into an abstract space of non-relationality.

However, siting satellites in a zone of pure abstraction proves inaccurate. "Satellites take place within the world they presume to picture. …[A] satellite view is situated within the perceptual

world." [32] Satellites are only *notionally* unsituated, and do not in fact float in a frictionless nowhere. Both satellites and drones expand and reconfigure the range, scope, potentialities, perspective, and vantage points that have defined the parameters of human vison and the act of seeing.

Nevertheless, the technological parameters and symbolic resonance of drone sensing differ from the remote "viewing" performed by satellites. Placed in conversation with the inhumanly scaled space roamed by satellites, the aerial domain in which drones hover becomes proximate. They disrupt and defamiliarize human vision by dint of this closeness, this sudden immediacy and relationality. The greater proximity of drones to the earth, to human (ap)perception, and the resultant oscillation between presence/absence, visibility, overlays the psychological and physical effects of being surveilled, or invaded, with a pronounced haptic quality–of being touched, heard, or, of course sadly, plunged into excruciating pain.

To end on a cautionary note: as engines of collateral damage, drones often kill hundreds within their blast radii. The body count that rises daily as a result of drone attacks not only adds *gravitas* to their deployment in art practice, but necessitates extreme mindfulness and care in both the production and the reception of drone-related artworks as well as raising the question of how to meaningfully enact resistance against and critically intervene not only in the culture of fear engendered by militarization/weaponization of drone technology, but also in the institutions, power relations, and models of cultural control that subtend this fear.

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