Rogue Pixels: Indexicality and Algorithmic Camouflage

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ABSTRACT

The resolution of publicly available satellite photography is limited to 50 cm a pixel. Every pixel in a satellite image is a single, solid color. The reasons for the resolution limit are tactical as well as protective: according to forensic architect Eyal Weizman, it maintains the privacy of individuals on the ground as well as makes the consequences of state violence harder to investigate. A uniformly colored pixel can be evidence of a drone attack or proof that it never happened. The indexical evidence ambivalently sustains both interpretations. If camouflage has been traditionally thought of as a blending into the contiguous environment, often geared toward a camera's gaze, in this essay I look to the reorientation of camouflage away from the adjacent surroundings and toward the mediating structures of the interface and database. The objective of camouflage is now to merge into arrays of information and to slip below the threshold of detectability. This essay examines the work of artists and activists, such as Hito Steyerl, Zach Blas, and Adam Harvey, who strategize ways of becoming "rogue pixels" hiding in "the cracks of our standards of resolution," resisting the means by which our bodies are indexed on virtual interfaces and algorithmically parsed as data.

Forensic architect Eyal Weizman studies satellite images of the earth's surface and the buildings, roads, and other man-made structures that dot its contours. He looks for evidence of state violence, armed conflict, human rights violations, and ecological disaster. But witnessing and testifying to material events—at a distance and on high—is not easy, even with modern technology at one's fingertips. The resolution of publicly available satellite photography is limited to 50 cm a pixel (see fig. 1). Every pixel in a satellite image is a single, solid color. This limitation is not dictated by the hardware, which can render images with much finer detail, but by software for the sake of privacy: at this resolution, publicly available images cannot picture the human body

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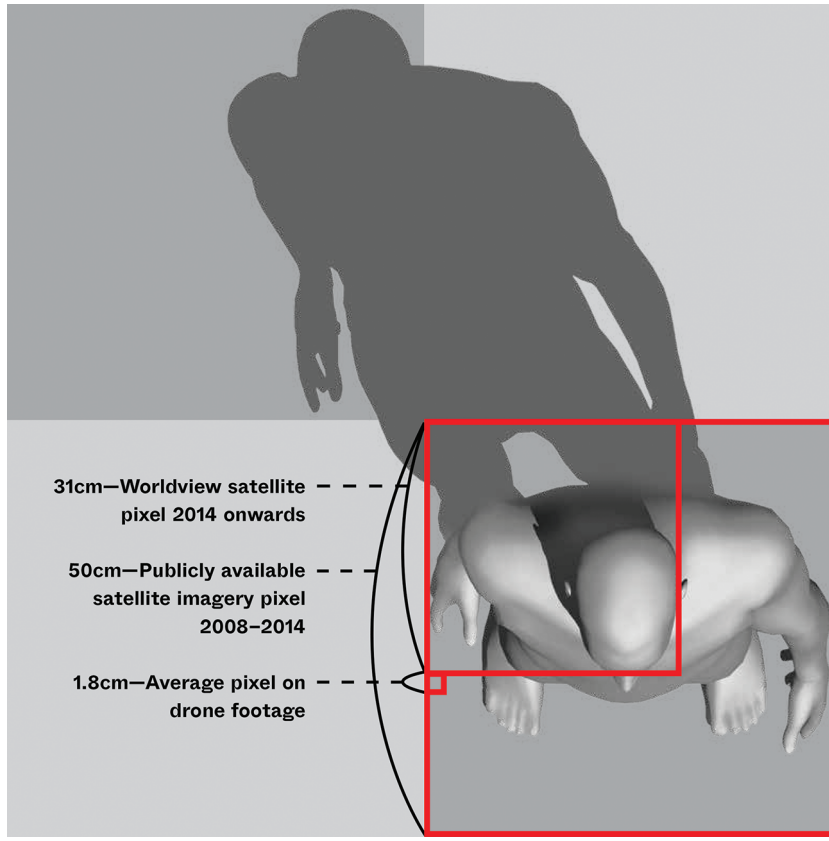


Figure 1. The photographic modular: pixel sizes in relation to the dimensions of the human body. Forensic Architecture, 2013.

(Weizman 2015). Every individual disappears into a block of color. State agencies and militaries, however, are not handicapped by resolution restrictions, and they have access to other technologies with a much clearer view of the terrain and its inhabitants. The Predator UAV, for instance, can use its ARGUS-IS 1.8 gigapixel surveillance system to clearly see objects as small as six inches from 17,000 feet above (Stanley 2013).[1] The reasons, then, for the resolution limit are tactical as well as protective. "Not only are strategic sites camouflaged by the 50 cm pixel resolution," Weizman explains, "but the consequences of state violence and violations become harder to investigate. An even more severe

1. ARGUS-IS is not simply a camera, but more than 100 independently steerable video streams simultaneously covering fifteen square miles (Stanley 2013).

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limitation on the resolution of satellite imagery in Israel and the occupied territories requires that providers degrade their images to a resolution of 1m per pixel. This has the effect, intended no doubt, of limiting the ability of independent organizations to monitor state action in the area" (Weizman and Weizman 2014, 10). Outside observers cannot see anything that is smaller than a pixel. Even details larger than 50 or 100 cm can blend into a blocky, unreadable patchwork of unyielding information. On the level of the image or the interface, all evidence of an attack can disappear into the screen's color mosaic.[2] The goal of a covert operation, then, is not just to go undetected in real space but also to intervene in the scene at or below the "threshold of detectability" (Weizman 2015).

Drone munitions, such as Hellfire and Spike missiles, can be equipped with delay fuses, so that they may drop through the ceiling of a building before detonating, making only a small hole. Once inside, the bombs explode shrapnel throughout the rooms. "This blast of small fragments is designed to kill people but to leave the structure intact. . . . Seen from above, the hole in the roof is the only visible trace that the building was attacked by drones" (Weizman 2015). And this hole in the roof may only be visible to on-site observers; it is still too small to appear in public images. If this is the case, that the state can so easily hide evidence within the index, what would a counter-gesture look like? This essay will look to the work of artists and activists who strategize ways, in the words of Hito Steyerl's narrator in her 2013 video *How Not to Be Seen*, to become "rogue pixels" hiding in "the cracks of our standards of resolution," and who bring art practice into conversation with anthropology and archaeology via a reconsideration of our bodies as they are indexed on virtual interfaces and algorithmically parsed as data. They explore how we might disappear into the index by exploiting the limitations of data capture to hide in plain sight. If, following the work of historian of science and film Hanna Rose Shell, camouflage has been traditionally thought of as the blending into the contiguous environment, often geared toward a particular viewer's or camera's gaze (Shell 2012, 14–15), in this essay I look to the reorientation of camouflage away from blending into the adjacent environment and toward the interface—toward the intervening informational surface between the systems of capture and the subjects of that power. The interface, per Branden Hookway, is "properly a form of relating to technology, and so constitute a relationship already given. . . . The

2. This is not true on the ground, of course, where the impact of attacks is very apparent to those in the area. Journalists, lawyers, and activists, however, have a very hard time getting to various theaters of war, especially those subject to drone strikes, as I discuss later in this essay.

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interface precedes the purely technological, just as one encounters the mirror image before the mirror itself" (Hookway 2014, 1). The interface typically operates invisibly or transparently so that, as Hookway describes, we see the image rather than the mirror surface. Because of this, Alexander Galloway writes, interfaces such as "video or computer screens, keypads, ATM kiosks, and so on—are often not understood as the surfaces they actually are but as 'doorways or windows'" (Galloway 2004, 30). Interfaces, then, when they are functioning well, tend to "self-annihilate" by becoming completely transparent (25). Interfaces only become manifestly visible when they cease to function properly or when a disturbance interferes with seamless transmission and translation. Visibility is synonymous with dysfunction (Poissant 2007, 240). If pixel degradation makes the interface clunky and "unworkable" (Galloway 2004, 36) through the introduction of unexpected visual interference, it also provides a model of tactical counter-gestures. The objective of camouflage in our era of surveillance, dataveillance, and biometric quantification, I will argue, is no longer to blend into the surrounding world but to "unwork" the interface—to become noisy, unreadable, or opaque—or to merge into arrays of information by slipping below the threshold of resolution.

Indexical Ambivalence

A single, uniformly colored pixel can be evidence of an attack or proof that it never happened. The photographic evidence equally sustains both interpretations. This ambivalence is not simply a result of state regulations on resolution (though the unevenness of access certainly is) or a specific effect of digitality; this ambiguity is an inherent function of both the indexical image and the interface on which it appears.[3]

In art historical discourse and media theory, however, the index has typically been more narrowly understood as a sign that functions as a fact and carries with it secure evidentiary information. For Susan Sontag, among others, these qualities have been tied up with the "physicality" of the indexical sign. These interpretations stem from Charles Sanders Peirce's discussion of the unusual characteristics of the analog photograph, which was still a relatively new technology at the time he was writing. "Photographs, especially instantaneous photographs," Peirce wrote in the very early twentieth century, "are very instructive

3. Part of the argument that follows is drawn from my book *Here/There: Telepresence, Touch, and Art at the Interface* (Paulsen 2017), in which I also discuss Hito Steyerl's *How Not To Be Seen: A Fucking Didactic .MOV File*.

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because we know that they are in certain respects exactly like the objects they represent. This resemblance is due to photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature. In that aspect, then, they belong to the second class of signs [indices], those by physical connection" (*PWP*, 106). Significantly, this description of the photograph comes in the midst of Peirce's discussion of icons, those signs that operate by means of resemblance. Photographs constitute a special type of representational sign in that they are both icons and indices. They look like their referents, but this resemblance is a product of an existential, necessary connection, one Peirce describes in this particular passage as "physical." Photographs have often served as markers of truth because of this combination of close resemblance and existential grounding.

The impact of this description of the photograph has shaped the way art historians and film theorists have tended to understand indexical signs in general. By way of this description, the photograph became synonymous with the index (rather than a singular odd example), and the index's identity, within these disciplinary discourses, at least, became tied up with physicality, materiality, proof, and the past. Susan Sontag, for example, emphasizes the physical touch that created the photograph as a means of both foregrounding the indexical underpinnings of the photograph and establishing its relationship to truth and proof. Photographs, Sontag writes, are "able to usurp reality because first of all a photograph is not only an image (as a painting is an image), an interpretation of the real; it is also a trace, something directly stenciled off the real, like a footprint or a death mask." A photograph is a "material vestige of its subject in a way no painting can ever be" (Sontag 1977, 154). In this passage, Sontag aligns the photograph with some well-known examples of indices derived from Peirce's taxonomy—footprints and death masks. Both of these signs, which look like the things they represent, were made by pressing one material into another: a foot presses into clay and makes a footprint; plaster is placed on a face and assumes its particular shape. Both are also signs that endure: they preserve a moment from the past in a physical, material, and representational form. Sontag's descriptions of the photograph, footprint, and death mask emphasize these characteristics—they are "traces," "material vestiges," and "direct stencils off the real." The great theorist of cinema André Bazin, too, connects the photograph and the index in general to secure, material, evidentiary proof. In "The Ontology of the Photographic Image," he describes filmic images as "change mummified." It is as if, like the bones, skin, and rags sealed in a sarcophagus, the film "image is the object itself, freed from the conditions of space

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and time," captured and "embalmed," just as "the bodies of insects are preserved intact, out of the distant past, in amber" (Bazin 1967, 14). And while all of this may be true, one of the consequences of arguments such as these, especially for the history of art, is that the qualities of pastness, permanence, truth, and resemblance resulting from physical contact have come to be seen, inaccurately, as defining characteristics of indexicality rather than as the specific condition of the analog photograph.

Thus, when digital technologies became commonplace in the 1990s and the already tenuous materiality of the analog photograph (light particles touching emulsion) became even more attenuated (electronic sensors reading and translating environmental information), the indexicality and evidentiary quality of the photograph was put to question. Without physical touch, some worried that photography would lose its indexicality and evidentiary surety. Additionally, digital technologies were becoming so good at simulating the look of photographs or invisibly altering photographic images, that there was no longer a way to understand any photographic image as anything but an icon with little necessary relationship to existential reality. Accordingly, new media theorists such as Ann-Marie Willis (1990), Lev Manovich (2001), and W. J. Mitchell (1992) announced the apparent "death" of the photographic index.[4]

According to Willis, photography's "claim to be more truthful than painting has relied . . . on its indexicality, the fact that as a sign it is partially produced by the referent. It is as if the scene or object at which the camera was pointed imprinted itself on the film. With digitized photo imagery the viewer will never be able to be sure of this anymore—the index will be erased as the photo becomes pure iconicity" (1990, 201–2). Photography becomes just another form of painting.

Lev Manovich, writing more than a decade later, echoes and updates Willis's claim: cinema, once "the art of the index," was "an attempt to make art out of a footprint" (2001, 295). But digitization has changed that relationship. Film, which can now create images that appear to be "photographic" without a camera, "is no longer an indexical media technology, but, rather, a subgenre of painting" (295). The effects of this change are insidious: one can create images that look exactly like photographs but have no existential connection to what they represent, therefore calling into question the indexicality of *any* photo-

4. See, e.g., Willis (1990); Mitchell (1992); Manovich (2001). That digitization should raise the specter of death in photography is strange, Batchen argues, since, from its very beginning, photography has always been associated with death, as the Bazin quote above, and all related analog analogies to death masks and mummification, surely attest. See also Batchen (1999).

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realistic image. In Manovich's argument, the power to create convincingly photographic icons amounts to a forgery of the index. If the photographic effect can be so easily simulated, the result is that all indexical images are compromised by the new influx of doubt.

William J. Mitchell, who in *The Reconfigured Eye* provides an extended account of analog photography's long involvement with forgery and deception, closes that book with a warning about the threat of digital technology: "For a century and a half photographic evidence seemed unassailably probative. . . . Photographs appeared to be reliably manufactured commodities, readily distinguishable from other types of images. They were comfortably regarded as causally generated truthful reports about things in the real world. . . . But the emergence of digital imaging has irrevocably subverted these certainties, forcing us to adopt a far more wary and vigilant interpretive stance" (1992, 255). The threat of the digital, here, is so overwhelming that it makes analog photography's always-dubious status seem nostalgically secure. The analog photograph retroactively becomes a more stable document in the backward glance from the digital era. New vigilance, he argues, is necessary now that the material mark that aligned photography with indices—the footprint, the bullet hole, the death mask, those compelling signs that bear existential witness to their referents—has been replaced by an electronic pattern.

Elsewhere, particularly in my book *Here/There: Telepresence, Touch, and Art at the Interface* (2017), I have attempted to wrest the semiotic concept of the index away from the ways it has been used in photographic theory and art history, as outlined above. Instead of understanding the index narrowly as the material trace of a past physical contact, resulting in a legible, evidentiary record and therefore worrying about whether digital technologies maintain this material touch and the particular existential and evidentiary connections it implies, I returned to the semiotician Peirce's work to point out that the index has never essentially been a physical manifestation resemblance, proof, or truth but rather an instance of relationality, interpretation, and decision. Indices, I argued, following Peirce but avoiding his distracting discussion of the instantaneous photograph, are "dubious, open-ended, present-tense signs whose meanings are dependent upon context and clamor for attention and interpretation" (Paulsen 2017, 37). The index is a sign that establishes a set of connections and interrelations between it, the event that created it, and the receiver who interprets it. And, as such, it is an apt category for digital images, which provoke so much uncertainty and doubt and are so readily available for manipulation or tampering (such as intentional resolution degradation). Indices—analog or dig-

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ital—have always been signs of indeterminate meaning that require context, narration, and corroborating support to serve as evidence or to testify to a particular event. Indices are always in relation to a semiotic agent who must recognize and read them as such. By their very nature, indices are open to interpretation, misrecognition, and doubt.

Weizman's work on human rights underscores the urgency of affirming that the digital image can be indexical even when digitally altered, shadowed by doubt and disinformation. Take for instance the research his group, Forensic Architecture, conducted based on footage and photographs smuggled out of Miranshah in North Waziristan, Pakistan. Waziristan is part of the Federally Administered Tribal Areas (FATA) and is under what Forensic Architecture calls a "media blackout": residents and nonresidents are forbidden entry and exit, sending images or recording devices out of the area is prohibited (Forensic Architecture 2014, 411). The documents Forensic Architecture analyzed appeared as part of a report on MSNBC's *The Rachel Maddow Show* on June 29, 2012. The images depicted massive destruction and implied physical casualties: examining the fragmentation patterns of shrapnel across the interior walls of the affected rooms, Weizman and his team found large, body-shaped blank spots indicating that "something absorbed them." Absence of information here was evidence: "Although we could not be certain," Forensic Architecture writes, "it is possible that the absence of the fragments indicated the places where people died" (2014, 450). Careful architectural analysis, shadow measurement, and other investigation of details in the images lead Forensic Architecture to what they thought was the precise physical location of the destroyed building. Satellite images of the site taken the day after the reported attack revealed nothing. The degraded images showed the fuzzy, indeterminate outlines of buildings and obscuring swaths of blocky shadow (fig. 2). If one was looking for it, however, the roughly triangular patch of darker pixels in the center left of the image looks remarkably similar to the collapsed roof in the smuggled site photographs. "The destruction was thus captured at the threshold of visibility in the image. Might this cluster of pixels," Forensic Architecture writes, "represent a destroyed roof, cluttered objects, or the entry hole of a missile" (2014, 446). Weizman's work pushes the question: How can we know what we cannot see?

In this essay, I wish to follow a different line of thought from the idea that digital technologies might jeopardize the indexical basis of photographic images and consider instead how one can inhabit and exploit the ambiguities between the icon and the index that the discussions of digital death raise. In an era in which we are continually surveilled, biometrically scanned, and tracked via

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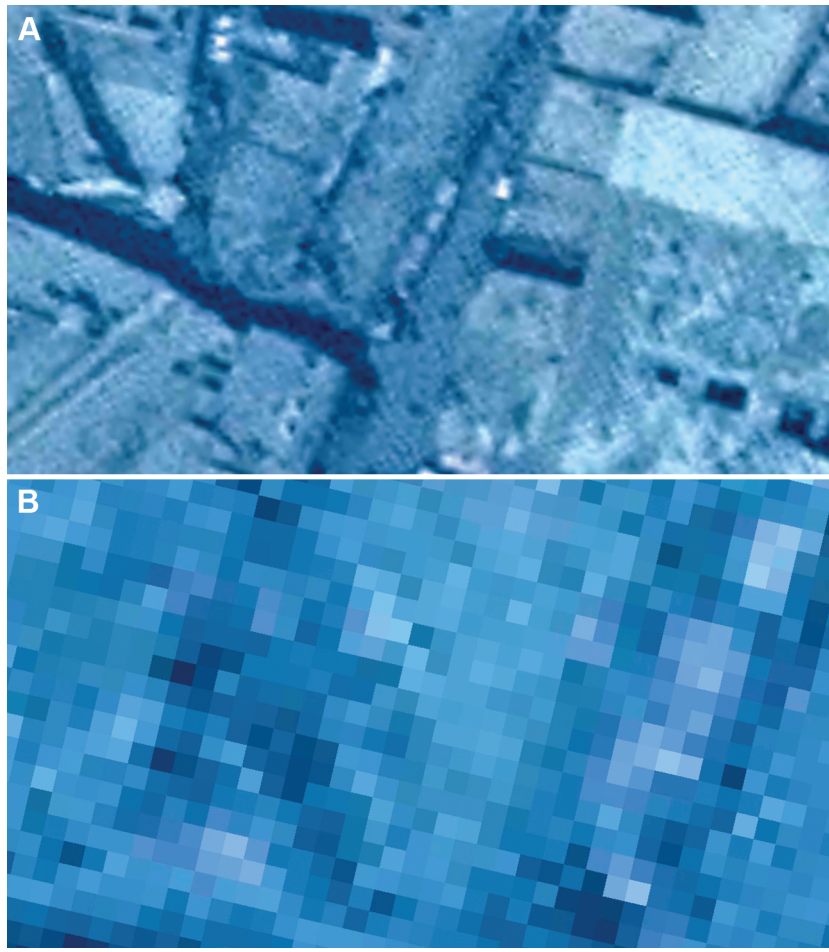


Figure 2. *A*, Satellite image taken the day after the drone strike (March 31, 2012) on Miranshah, Pakistan. Each pixel represents about 50 x 50 cm squared of terrain, which is the resolution that publicly available satellite images are degraded in order to preserve the visual advantage of militaries and state agencies. Image: Digitalglobe, March 31, 2012. *B*, The destruction was thus captured at the threshold of visibility in the image. This cluster of pixels might represent a destroyed roof, cluttered objects, or the entry hole of a missile. Image: Digitalglobe, March 31, 2012.

our trails of data, the artists I discuss in what follows imagine what might be the potential in failing to index in authoritative modes of capture. Rather than worrying that we might mistake an iconic image for an indexical one, these artists and activists strategize ways of making the interface unworkable or becoming unreadable noise.

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The Threshold of Visibility

Hanna Rose Shell raises a similar question to Weitzman in her book *Hide and Seek: Camouflage, Photography, and the Media of Reconnaissance*: "Is it ever possible to be sure what one is not seeing?" (2012, 46).[5] While strategic concealment had long been a military practice, it was not until the twentieth century that such artisanal skills and scientific knowledge combined into an institutionalized practice of camouflage (15). This evolution, Shell argues, was a response to the photographic camera and the need to hide from a specific form of visual capture and from a particular vantage point. "Trench warfare," she writes, "was made infinitely more complicated by the new possibilities of aerial photography" (15). One was no longer just hiding from other adversaries presently in the field, but from the photographic camera and from being spotted in the subtle differences between images taken at different times. While she defines camouflage as for the camera, her historical look at the techniques tethers the practice to the surrounding, adjacent environment. Camouflage is, according to Shell, "human mimicry of natural forms" (14). "It is a calculated form of subjectivity. As such, it is an individuated form of self-awareness that is also part of a network of institutional practices" (19).

Shell's formulation of camouflage as an "adaptive logic of escape from photographic representation," even if attached to blending into the surrounding—often "natural"—environment, is a useful definition in our current media milieu (2012, 19).[6] While she grounds camouflage in mimicking tones and textures of the immediate, adjacent objects and settings, it always does so for a particularly positioned and mediated vantage point, whether that is an enemy or predator in the same landscape or the lens of a photographic camera. What has changed technologically and informationally since the time of Shell's objects, which are primarily from the late nineteenth and early twentieth centuries, is that the tactic is no longer to blend into the background or the physical, material surroundings, but into the informational array of the mediating structure,

5. In her book, Shell deals with indexicality but in the very narrow, material way I have critiqued above and in other texts. She is interested in the photograph as a "direct trace," and it is, for her, obviously tied up with practices like taxidermy. She does, however, note that "reception and consumption play a crucial role in determining whatever signifying function the image will have" (2012, 11).

6. While Shell discusses camouflage as typically and traditionally "human mimicry of natural forms," as quoted above, it is clear and obvious that these practices and processes could just as easily be applied to built or "unnatural" surroundings. Her book sticks closely, however, to the interactions of animal (human and otherwise) and landscape, and even in her conclusion, in which she discusses new digital and video-based technologies that could aid one in blending into any background (at least from a very specific vantage point), the mimicry in question is a human appropriating the powers of the chameleon rather than mimicking the background.

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and to do so might mean becoming excessively visible in real space in order to disappear on the interface.

To become invisible, one must merge into the informational surfaces or become unreadable noise in the databases that mediate distant viewers and targets. This is certainly true in the military practices Weizman and Forensic Architecture analyze. Paul Virilio identified this shift in his collection of essays on the first Gulf War, *Desert Screen*. The desert battleground, he wrote, "is a screen where all is exposed to the searching eye of an adversary employing the full array of object-acquisition systems" (2002, 26–27). The "adaptive logics" of camouflage would not just shift with the physical environment, but evolve with the media environment and the new technologies through which territories and people are surveilled and attacked. These adaptive logics must take into account that the "object-acquisition systems" held by the state far surpass those available to the public.

While in this essay I don't attempt to address, condone, or explicitly encourage any retaliative actions one might take against state powers in cases like those that Weizman and his colleagues investigate (though, clearly, his work gives compelling evidence of human rights violations in which the perpetrators are various governmental agencies), I am, rather, interested in ways in which artists and activists are beginning to think about the screen and database as sites for adaptive camouflage as a defense against the invasions into our visual and data privacy. As such, the works that follow are not reciprocal actions or retaliations against state action, but instead are subversive adaptations to and reflexive aesthetizations of the new environment that help us to think through the structural asymmetries of surveillance. If pixel degradation is ostensibly in place to protect the privacy of individuals, the artists I discuss below theorize what one might do to disappear or become private within authoritarian acquisition systems.

How Not to Be Seen

Hito Steyerl's *How Not to Be Seen: A Fucking Didactic .MOV File* (2013) is a humorous instructional video for going invisible in the digital age. Steyerl borrows the tone and the title from a 1968 *Monty Python* sketch that parodied WWII educational films aimed at helping British citizens survive an invasion. Monty Python's spoof did not, like the films it parodied, give helpful, if terrifying, instructions for how to hide within the natural and urban environment. Instead, it moved the WWII concerns with physical invasion and photographic capture into the Cold War era with nuclear weapons and extensive surveillance.

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In the first moments of the skit, over the image of scrubby landscape devoid of people, John Cleese dryly announces to the viewer, "In this picture there are forty people. None of them can be seen." The subjects are well hidden. They are completely invisible to the photographic camera. Cleese then calls each person hiding, by name and address, to reveal him or herself. When the individuals stand up, exposing how expertly they have used the techniques of natural camouflage, they are promptly shot, demonstrating, in Cleese's words, "the value of not being seen." Quickly, the hidden subjects wise-up and remain in hiding. This does not protect them, despite their skillful cover. The fields are blanketed with fire, neighbors inform on the hidden people in a Stasi-like network of surveillance, until, finally, atom bombs repeatedly drop and explode, rendering hiding pointless. Terror, here, is informational and panoptic, and the weapons remote and obliterating. Blending into the natural world or hiding from a still camera no longer seems useful after the bombings of Hiroshima and Nagasaki, and being well hidden in space is futile if an informational network is constantly collecting and reporting data on everyone's whereabouts.

Steyerl's update of *Monty Python*'s parody moves the discussion of camouflage into the digital age and onto the screen. That is, rather than seeking to disguise oneself in the surroundings so that one would not be easily discernible in the image produced by the camera, one would need to orient themselves toward the informational array so that they might fail to register indexically within that system even if that means becoming even more notable and visible within that physical environment. *How Not to Be Seen: A Fucking Didactic Educational .MOV File* begins similarly to the *Monty Python* original. A man's voice, this time dour and computerized, narrates directions for "becoming invisible for a camera." Instead of the misty, verdant fields of the English countryside, the image is of a 1951 United States Air Force resolution target, used for testing the resolution of optical devices (such as microscopes, cameras, and scanners), against a Chroma key green screen (fig. 3, *bottom*). The ronchi rulings, organized as series of horizontal and vertical hatch marks, begin large in the lower right-hand corner of the chart and move in a clockwise spiral, getting smaller and smaller as they approach the center. The test chart has a vertiginous effect, as if it is caught in the mise en abyme swirl of video feedback. Steyerl's image houses an internal disturbance: the ronchi diagram, used to fine-tune and test the accuracy of cameras, is set against a studio prop that creates effective illusions of transposition, superimposition, and often erasure. The narrator of her video dictates his first lesson, "How to Make Something Invisible for a Camera," over this strange scene. He instructs the viewer "to hide, to re-

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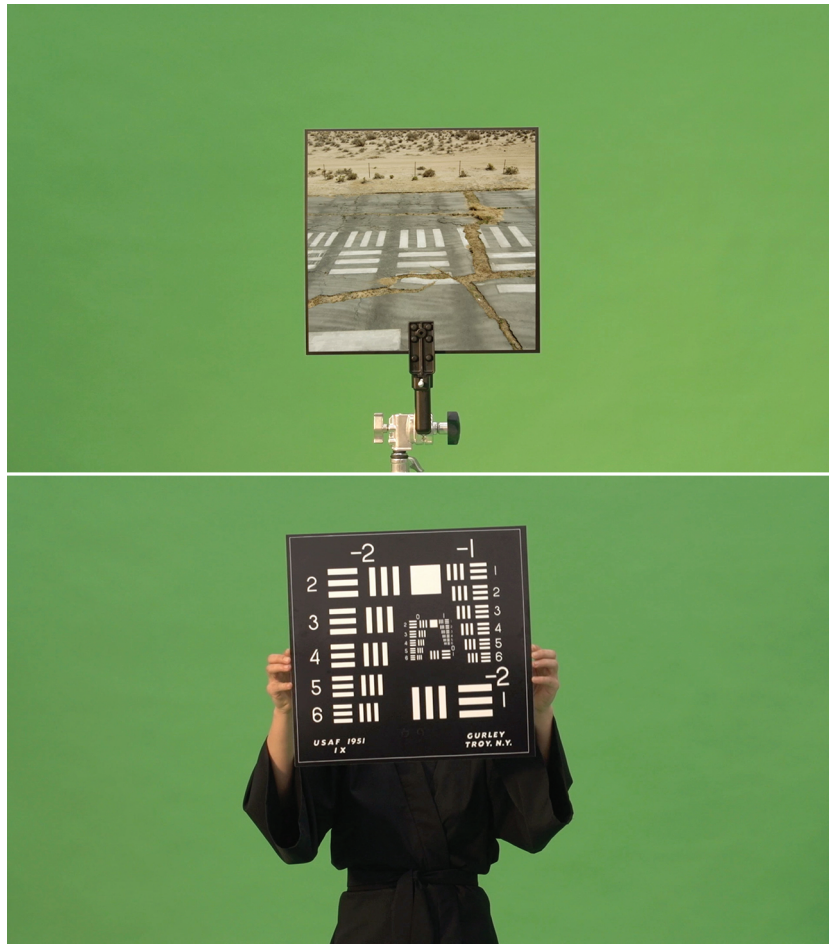


Figure 3. *How Not to Be Seen: A Fucking Didactic Educational .MOV File*, 2013. HD video, single screen in architectural environment. 15 minutes, 52 seconds. Image CC 4.0 Hito Steyerl. Image courtesy of the artist and Andrew Kreps Gallery, New York.

move, to go off screen, to disappear." As he lists these tactics, Steyerl enters the frame, first just with her hand blocking the view of the target, then picking it up and carrying it out of frame, so that only the green screen remains. Across a cut, the target reappears, but its distinctive pattern has been replaced with a satellite image of a similar pattern painted onto an asphalt pad in the desert. The camera then vertiginously zooms out until the entire earth is within the frame (fig. 3, *top*). "This is a resolution target," the voice explains. "It measures the resolution of the world as a picture. Resolution determines visibility. Whatever is not cap-

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tured by resolution is invisible." Steyerl is rapidly communicating Weizman's lessons: the world is a picture, and how it is pictured is determined by the technology by which it is captured and who controls that technology. Anything that falls out of resolution, below the threshold of detectability, is effectively invisible. While Weizman's work takes up the serious human rights issues associated with the lossy resolution of the world as a picture, Steyerl (and her narrator) begin to reverse the terms and jokingly play within "the cracks of resolution."

Militaries and state agencies have, clearly, devised ways to disappear into the indexical image by manipulating resolution. Steyerl and her narrator, however, perform a series of operations that potentially give bodies on the ground some agency within that system. The next lesson, "How to Hide in Plain Sight," presents an absurd list of tactics: "pretend you are not there, hide in plain sight, to scroll, to wipe, to erase, to shrink, to take a picture." The instructions are incongruous, initially, because they seem impossible to enact as a body in real space. If one thinks about the field of operation as the interface, however, the suggestions are far more reasonable. Scroll, wipe, erase, and shrink are all gestures one uses to remove or minimize information on a screen. The lessons communicated over the course of the video enact a slide from the physical space of naturalistic camouflage to the data space of algorithmic and informational resistance. Steyerl's instructions for "How to Become Invisible by Becoming a Picture" run the gamut from traditional strategies such as "to conceal, to cloak," to screen based practices such as "to key." In front of a series of television and screen test patterns, Steyerl broadly applies Chroma key green paint to her face, imitating the gestures of a soldier obscuring his face with dirt and mud to match the surrounding woods. Instead of blending into the background, Steyerl completely disappears into the complicated resolution patterns behind her (fig. 4). She merges into the screen. The remaining lessons continue to slip between the human body in space and the body as information. "Thirteen Ways of Becoming Invisible by Disappearing" similarly ranges from the physical and material ("live in a gated community," "being a disappeared person as an enemy of the state") to the informational, whether that be demographic ("being female and over 50," "being undocumented or poor") or represents a full transition to thinking about how one appears on the screen or in databases ("surfing the dark web," "being a dead pixel," "being caught in a spam filter").

Interspersed with the lessons, *How Not to Be Seen: A Fucking Didactic .MOV File* conveys historical and technological information about the changing camera and resolution technology. The ronchi rule patterns of the analog era, the

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Figure 4. *How Not to Be Seen: A Fucking Didactic Educational .MOV File*, 2013. HD video, single screen in architectural environment. 15 minutes, 52 seconds. Image CC 4.0 Hito Steyerl. Image courtesy of the artist and Andrew Kreps Gallery, New York.

viewer is told, were replaced in 2000 with a pixel-based resolution chart for focusing aerial and satellite cameras (fig. 5, *top*). In 1996, resolution was "twelve meters per pixel; today it is one foot." In the contemporary era, in which one is surreptitiously surveilled from space or by invisibly hovering drones, the basic strategy for camouflage is to become "smaller or equal to one pixel" (fig. 5, *bottom*). Steyerl's humorous video seriously suggests that individuals should begin to think the way the state does, as Weizman illustrates. "Most important things," her narrator tells the viewer, "want to remain invisible: love is invisi-

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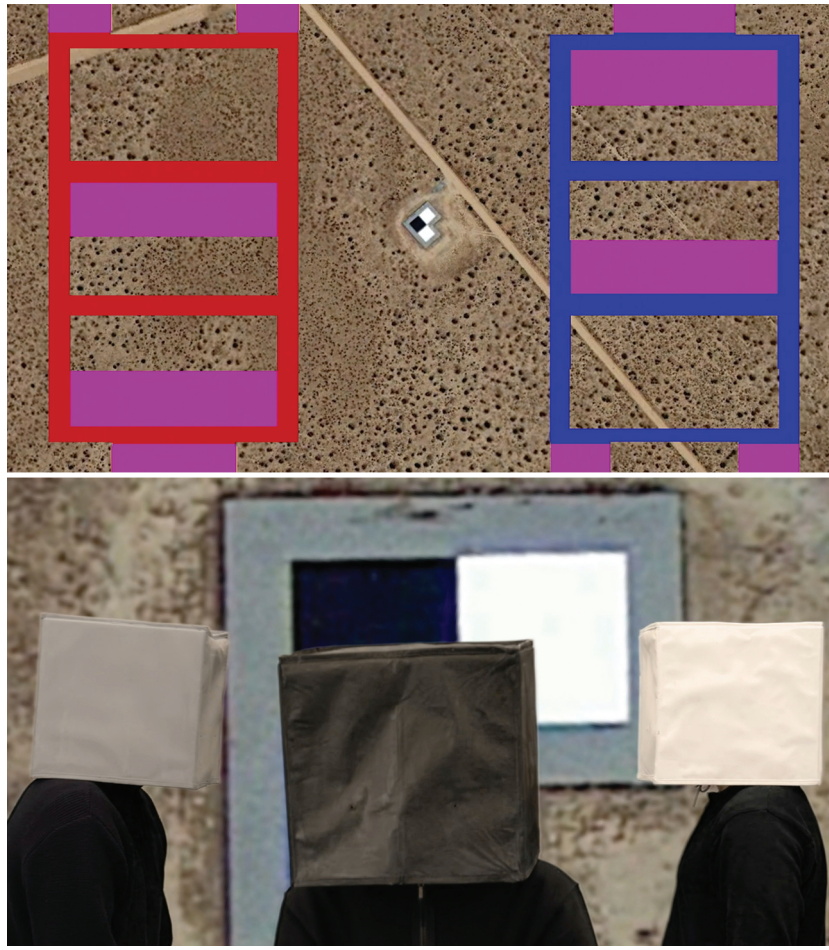


Figure 5. *How Not to Be Seen: A Fucking Didactic Educational .MOV File*, 2013. HD video, single screen in architectural environment. 15 minutes, 52 seconds. Image CC 4.0 Hito Steyerl. Image courtesy of the artist and Andrew Kreps Gallery, New York.

ble; war is invisible; capital is invisible," and by extension, you should be invisible too.

Calculated Forms of Subjectivity

In his essay "Cage of Information," artist Zach Blas describes the contemporary life as one "marked by an exponential increase in the correlation of being visible and being documented." And both visibility and documentation are increasingly a result of the body's encounter with informational capture: "More

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than ever before, information is generated from bodies through a multitude of capture devices that proliferate globally. To move through physical space is also to traverse the sprawl of CCTVS; online activity is subject constant aggregation and dataveillance; smart phones exude geo-traces that are waiting to be mapped, now and in the future; commercial and governmental services alike necessitate the surrender of personal data; while contemporary bureaucracies, with the aid of management software, transform the body and its activities into a perpetually fertile site for the increasingly precise documentation of life" (Blas 2016, 82). Accordingly, Blas suggests that now may be the moment to rethink whether a politics of visibility is still one of empowerment. If becoming visible—as a demographic, a minority, or a political force—was a key part of the battle for democracy and equality in the civil rights era, Blas argues, "any exposure of bodies is now usurped as a potential pathway to control and governance, and thus, undoes documentation as a purely liberatory project" (2016, 82). His work explores what it might mean to resist appearing as information on screens or in databases while still remaining emphatically material and visible in the immediate world.

Face Cages (2013–16; fig. 6) materialize, through metal and pain, the biometric diagrams used by facial recognition software in conjunction with surveillance technology to identify, police, and database individuals. Fabricated in metal, the lattice-like sculptures render the immaterial digital map of facial landmarks into bespoke but exceptionally uncomfortable headgear that, in Blas's words, evokes "a material resonance with handcuffs, prison bars, and torture devices used during the Medieval period and slavery in the United States" (2013). The biometric diagram is what Blas, following Shoshana Amielle Magnet, calls "a cage of information." Its aim is to fulfill a neoliberal dream of reducing individuals to quantifiable and searchable data, and to make operative "absolute protocols for calculating and documenting humans: a single template to index and identify a face, eye, hand etc." (Blas 2016, 82).[7] Against the algorithmic abstraction (presumed) capable of indexing any individual, Blas advo-

7. Biometric data are prone to failure and in their failures often expose the cultural and ideological biases upon which supposedly objective and mathematical systems are built. For example, as Blas points out, "Biometric machines often fail to recognize non-normative, minoritarian persons, which makes such people vulnerable to discrimination, violence, and criminalization: Asian women's hands fail to be legible to fingerprint devices; eyes with cataracts hinder iris scans; dark skin continues to be undetectable; and non-normative formations of age, gender, and race frequently fail successful detection. These examples illustrate that the abstract, surface calculations biometrics performs on the body are gross, harmful reductions" (Blas 2013). Dark skin, which often resists accurate mapping by facial recognition software, results in false positives within the database. The overrepresentation of dark-skinned faces in police databases compounds the already biased and problematic racial profiling and targeting that plague law enforcement.

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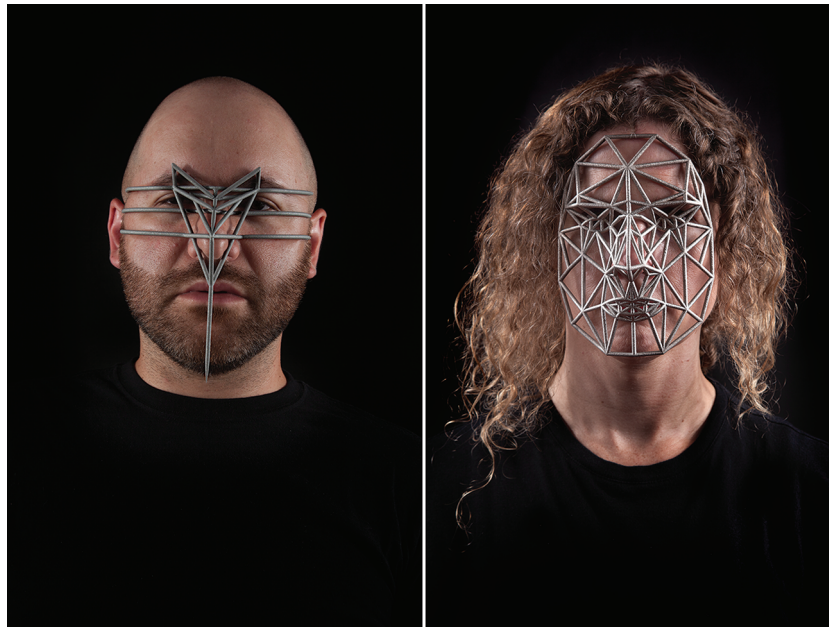


Figure 6. *Left,* Zach Blas, *Face Cage #1*. Endurance performance with Zach Blas, 2015. Photo by Christopher O'Leary. *Right,* Zach Blas, *Face Cage #3*. Endurance performance with Micha Cárdenas, 2014. Photo by Christopher O'Leary.

cates for "an aesthetic practice not of abstraction but excessive materiality and pure opacity" (Blas 2016, 89). Blas's earlier series of works, *Facial Weaponization Suite* (2011–14), enacts this strategy of opacity and anti-algorithmic materiality. For each of the four iterations of *Facial Weaponization Suite*, Blas combined the biometric data of collaborators to produce disfiguring masks to be worn in public actions or performances. The first mask, *Fag Face* (fig. 7), merges and metastasizes the landmark features of the participants into amorphous, barely human lumps of shiny plastic and shadow. Blas created this effect by altering the faces "by hand" rather than using an algorithm, which would just average and homogenize the features into a prototypical face, one more prone to false-positive identification because of its standardization. Instead, he creates excessive volumes by skewing the traits along multiple axes. While each mask indexes the physical features of a closed set of individuals, these qualities are rendered unrecognizable and opaque.

Blas's technique of vacuum-molding the masks from clear sheets of plastic and then painting the interior surfaces is quite literally a process of rendering the transparent opaque. *Facial Weaponization* is a political as well as material

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Figure 7. Zach Blas, *Facial Weaponization Suite: Fag Face Mask*. October 20, 2012, Los Angeles, CA. Photo by Christopher O'Leary.

process. Not only are the wearers' faces hidden from others; they also become invisible to the algorithmic eye of surveillance. The masks, though created from facial data, can no longer be read as such. By wearing the masks, Blas and his collaborators become hypervisible in real, embodied space. They stand out in

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and mark themselves as a group or coalition, but at the same time they become unknowable. They cease to surrender information to the systems that aim to capture and parse them.

The *Fag Face* masks and public actions were organized as part of the 2013 reclaim:pride event at the Christopher Street West Pride Festival in West Hollywood, Los Angeles. Gay pride parades have long served and advanced civil rights for LGBTIQ communities through visibility. The University of Southern California's One National Gay & Lesbian Archives sponsored Blas's intervention at the parade as a counterpoint to the dominant queer politics of visibility. Blas and his collaborators set up an informational booth that educated paradegoers about facial recognition technology and, in particular, scientific studies that claimed to prove that test subjects could identify homosexual faces—stripped of "all markings and accessories," including hair, makeup, and jewelry—even when only exposed to the image for 50 milliseconds. In his 2012 video *Facial Weaponization Communiqué: Fag Face*, he wonders: "What could be the benefits of proving to the world that such a recognition apparatus exists? Does it not only further confirm and scientifically validate one of the processes of LGBTIQ stereotyping, categories like 'fag face' and 'gay face'? It is easy enough to claim that these studies parse us into categories that will inevitably be used against us. It offers a visibility that will attempt to control, monitor, and police us" (Blas 2012). In the age of quantification and ubiquitous surveillance, visibility can be a kind of violence.

Against the algorithmic processes that turn us into information to be indexed, databased, and cross-referenced, Blas opts for a hypervisibility that renders him invisible on the interface. Other artists and activists have affected similarly flamboyant disappearances. Adam Harvey's *CV Dazzle* project has an algorithmic effect similar to Blas's more material and confrontational tactics. Carefully constructed and outlandishly avant-garde hair and makeup styles make their wearers stand out in crowds, but disappear in frame. Based on WWI dazzle camouflage techniques that aimed, often unsuccessfully, to disguise a ship's range through erratic, high-contrast patterning, Harvey's camouflage is designed for a very specific "object acquisition system": the Viola Jones Face detection algorithm, a common open-source form of computer vision software. Mirroring the covert logics Weizman's work uncovers, Harvey's designs play with the probabilistic parameters of computer vision by altering the key landmarks that facial recognition software index, thereby operating below the "threshold of detection" (Harvey). "Because face detection is the first step in any automated facial recognition system," he writes, "blocking the detection

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stage also blocks any subsequent facial analysis including recognition and emotional analysis. Therefore, CV Dazzle blocks facial recognition by blocking face detection" (Harvey). A new project, *Hyperface* (2016), reverses this logic, creating a textile-based camouflage that overwhelms software with false positives. Worn together, one could imagine disappearing completely into the interface and becoming un-indexible as information.

Into the Interface

The etymology of "camouflage" leads back to the French *camouflet*, which describes a carefully hidden land mine or smoke bomb that explodes without any surface rupture (Shell 2012, 14). Historian of camouflage Roy R. Behrens connects the term to *chault mouflet*, an archaic expression describing a joke that produced a "hot face" by placing a lit hollow paper cone under the nose of a sleeping victim to arouse him with a sudden breath of smoke (Behrens 2002, 171). The term's origins also connect back to the French *camoufler* or Italian *camuffare*, both meaning to "make-up" with cosmetics.[8] What is important or resonant here is that these early roots of camouflage have little or nothing to do with blending into the surrounding nature or the contiguous environment. Rather, they all describe creating a smoke screen or intervening surface between one party and another, or as the *Oxford English Dictionary* has it for *camoufler*, "between the besieged and the besieger." The *camoufler* is a "stifler" (*OED*). *Camouflers* operate on or as an interface. They commute their presence onto the screen. They think like pixels, like bits. They become noise in the system that makes the interface suddenly visible and opaque. As indices they become undecidable, unreadable.

Weizman and Forensic Architecture describe the camouflage techniques of the state and military in the age of mediated warfare. There is no pretense to disguising acts of violence in physical space. No disfiguring nets are thrown over crumbling facades; these operations are covert because of the rigorous control of images. Resolutions are degraded to hide within the index. This does not make the image non-indexical, for indices have always been caught between interpreter and the event that produced the index. They are always open to interpretation and doubt. Indices produce truth as easily as mis- or dis-information. The state has learned the mediating power of the index, and they have learned to hide within it. Steyerl, Blas, and Harvey, I argue here, have also learned the

8. Behrens and Shell both cite this connection to makeup. Behrens has the French *camoufler* as a derivative of *camouflet*, but Shell has *camouflet* as a derivative of the earlier, medieval Italian *camuffare* (Behrens 2002, 171; Shell 2012, 14).

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power of the interface as index and have developed strategies of being for the screen, or as Shell put it for all camouflage, they have developed "calculated forms of subjectivity" (2012, 19). Beyond calculated, these artists recognize that subjectivity and presence have become, for the systems of power at least, quantified numerical data points. Like the state, they move their indexical disinformation campaigns to the screen, to camouflage themselves in the cracks of resolution and the gaps in informational capture, and to make the interface unworkable and opaque. Galloway, writing of the history of networks, focuses on the materiality of networks—they are not "abstract concepts that describing shape or structure, but [are] specific technologies of power, organization and control" (2004, 282). He reminds his reader that "in the hands of the American Military, networks are classified not only as communication tools but as weapon systems, while in the hands of antiglobalization activists networks are mobilized as tools for disruption and evasion" (282). Resistance to networks of power and control, such as the networks of surveillance, tracking, and targeting that Weizman, Steyerl, Blas, and Harvey explore, must be countered by "a new exploit." Since the centralized networks of modernity have migrated to distributed networks, "co-opting the very tools of the former left, new models of political action are necessary" (294). While any new exploit, Galloway writes, must be "asymmetrical" to the distributed networks of control, they are never actually outside of the network; they are always formally within it; "intra-anti-network" practices must be "entirely native to the network form (293–94). The artists, designers, and architects in this essay model what these forms of algorithmic, indexical forms of resistance might look like as a reciprocal refusal to become informational.

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