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INGRID BURRINGTON

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SEPTEMBER 17 - NOVEMBER 11, 2016

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STATEMENT

In her seminal 1988 essay *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*, feminist scholar Donna Haraway called the fiction of an objective, scientific perspective "the God's-eye view from nowhere", a vantage point that "[promises] transcendence of all limits and responsibility" while annihilating the agency of anything and anyone subject to its gaze. I can think of no better way to describe the aerial perspective, particularly in the form the majority of the world experiences today via online mapping services.

Long before photography and the advent of aerospace, the aerial perspective was associated with power and control. It was through hand-surveyed and hand-drawn maps that sovereigns comprehended and claimed territories, a practice that persists today. The nascent form of aerial photography advanced rapidly during and due to the first two World Wars, and the development of space-based imagery from above began in 1958 with the US spy satellite program Corona, a Cold War initiative initially created to gain strategic insights on the Soviet Union's military capabilities. Corona remained classified until 1995, which was around the same time that regulations in the United States made it easier for private companies like DigitalGlobe to produce and sell high-resolution satellite imagery to civilians and companies, leading to the possibility of a product like Google Maps' satellite view.

These military legacies are, of course, not the *entire* history of satellite imagery — credit must be given to initiatives like NASA's Landsat program and countless scientific imagery projects by other governments. But they're hard to avoid even in its present-day civilian applications. For example, Google's entry into the realm of satellite imagery came in 2004 with their acquisition of Keyhole, a mapping software company initially funded by In-Q-Tel, the CIA's venture capital arm that, according to their mission statement, "identifies, adapts, and delivers innovative technology solutions to support the missions of the Central Intelligence Agency and broader U.S. Intelligence Community." Keyhole itself was a bit of a tongue-in-cheek name, a reference to the satellites used in the Corona project which used the naming system KH-1, KH-2, and so on — "KH" being an acronym for "keyhole", as in a spy peeking through one. Keyhole's primary mapping software became Google Earth in 2005, and a year later Google Maps formally launched.

Google's satellite imagery comes from a variety of sources (DigitalGlobe and the USGS are among the more prominent) stitched together to create what might be assumed by a user to be a complete and accurate portrait of the world. Google employs a variety of imagery analysis techniques to remove clouds or other obstructions from Google Maps satellite views. This means that at many scales, the images in Google Maps aren't actually images of places but composites of places; landscapes made from a pixel-by-pixel comparison process that renders the world in total equipoise, always and forever caught at early afternoon on a cloudless day.

In addition to manipulating imagery to produce an ideal God's-eye view from nowhere, Google's more overtly political manipulations of satellite imagery at different sites are at this point an open secret — the company has no official policy on removing or altering imagery, but enough internet sleuths have pored over different parts of the satellite landscapes to have merited a Wikipedia entry on the subject. It's also popular subject matter for artists, like Josh Begley (whose insights and support of this project are really appreciated) and Mishka Henner (whose *Dutch Landscapes* series documented many of the glitched-out military sites included in this collection). Of course, Google isn't the only one in this game — Bing and DigitalGlobe edit imagery too, usually at the request of the same government agencies that ask Google to make changes.

Finding these glitches in the landscape at times has felt like a weird cat-and-mouse game, one in which I keep losing to the vacillations of political and corporate agendas. For years, I'd heard rumors that Google deliberately removed or obscured its data centers from maps, and in some cases (such as the

Council Bluffs, Iowa data center included in this exhibition) I was able to capture it. But as I developed this project and began collecting images, Google's branding strategy changed. The data centers once treated as guarded secrets, presented only in carefully constructed glossy photos, were now a product to be sold, as the company rolled out Google Cloud services. Suddenly, what had been a mound of poorly Photoshopped dirt in Google Maps for years was a fully functioning data center that could be found as easily as Googling "Google Data Center, Iowa." In theory, this is a great development — Google's hiding fewer things on the map! Data center tourists, rejoice, your itinerary planning just got much easier. But Google will never own or admit to these manipulations of the landscape. There is no historical image record of these altered sites — the archive of Google glitches is a scattered, mostly low-res history, one that Google will probably never really have to answer for. Although visual evidence as instrument of accountability is nowhere more fraught than in the realm of the aerial perspective, it's disconcerting to see yet another questionable practice by a large platform reduced to folklore, rumor, and maybe some screenshots.

The legacies of satellite imagery — of imperialist security imperatives, idealistic aerospace innovation, and the privatization and proliferation of the God's-eye view — are collapsed in the browser tab, into a composite image containing far more complexity than its cloudless landscapes reveal. Lenticular prints are also composite images, but in a somewhat more transparent manner than satellite images. Two or more images to be used in a lenticular will be "interlaced" — basically cut into thin strips and woven together in a single image. The interlaced image is glitchy and blurred, a composite that never quite fits together. The layer of lenticular lenses makes it possible to separate the interlaced image by bending light that passes through them and hits the image. It's a fairly simple trick of light that has been used for decades, primarily in the production of advertisements and kitschy religious icons, but it's one that's weirdly well-suited to exploring the ambiguities of the satellite and aerial landscape. It renders images inherently unstable, only concealing their composite nature when a viewer stands completely still and looks at just the right angle. The sites documented in this project range from places integral to the development of the ubiquitous satellite perspective to sites transformed within and by that perspective. Where the digital satellite image collapses history, in a way the lenticular satellite image collapses my own ambivalence" — at the imaginary objective truth of the God's-eye view, at its fraught but at times unprovable histories, at my own instinctive awe at the scale and detail of so many of these landscapes. This is perhaps the only honest relationship I can think to have with the satellite perspective: complicating it by inhabiting and unraveling it. As Haraway notes in *Situated Knowledges*, "All these pictures of the world should not be allegories of infinite mobility and interchangeability but of elaborate specificity and difference and the loving care people might take to learn how to see faithfully from another's point of view, even when the other is our own machine."

Ingrid Burrington

RECONNAISSANCE

There are limits to what satellites can see. Commercial imaging machines orbiting the globe can't make out objects smaller than 25 cm for example. Their gaze can't penetrate leafy canopies or high-rise rooftops. And, they only see from one perspective: top-down, bird's-eye view. Nonetheless, satellites see a great deal, and the maps they generate purport a certain totality. You could say they advertise seeing everything with an asterisk, leaving the exceptions for the fine print.

While satellite imagery flattens the world in the course of its quest for total representation, lenticulars play another trick with perspective. Interlacing two images, with the help of fine hemispherical lenses, these optical novelties change depending on the angle of your gaze. Shifting left to right, or right to left, one version of reality collapses into another. Two truths reduced to one, contingent on where you stand; the insufficiency of a single viewpoint dramatized by the shortness of the distance between points A and B.

In "Reconnaissance", Ingrid Burrington's lenticular printed satellite imagery combines a kitsch dime-store technology with a multibillion-dollar military one. The series connects high-resolution aerial photography with the conditions of its production and redaction. Presenting downlinks, data centers, air bases and calibration targets as seen from hundreds of kilometers above the Earth's surface, the images refer to the infrastructure that made them. They offer traces of the satellites launched and glimpses of the machinery circulating the data captured by those machine eyes. By presenting two versions of each image, which the viewer can toggle between, shuffling from one side to the other, Burrington reanimates the infrastructures and processes that have been or are becoming obscured.

In *Volkel Air Base*, the lenticular oscillates between two different images both concealing the Dutch military airbase Vliegbasis Volkel. In one, the base is blacked out. In the other, it is camouflaged by a geometric blur seemingly produced with Photoshop's crystallize filter, the green and tan quilt of orderly fields all of a sudden disrupted by a pattern of kaleidoscopic prisms. Crystallize seems a friendly way to go about censorship. It's as if the classified parts of a text were redacted with "nothing to see here" printed in Comic Sans.

Still, seeing nothing is usually seeing something. In this case, it's witnessing evidence of digital mediations and governmental-commercial negotiations that stitch together the picture of "everything" that is displayed. It's hard to say where along the supply chain censorship takes place. Governments have been known to make demands of both satellite image vendors and online mapping services. Leveraging their purchasing power at different times, the US government has forced restrictions on vendors like DigitalGlobe and Geoeye, limiting what they can sell other clients. Following a 2007 terrorist attack on British military bases in Iraq allegedly planned using Google Earth intelligence, the UK government seems to have requested Google to censor images of the area. Google changed the map but a statement they gave to inquiring journalists wouldn't confirm so directly: "We are not prepared to discuss what we have discussed with them. But we do listen, and we are sensitive to requests." The maps too say and don't say at the same time.

Even when satellite photos are unedited, there are things that these images can't say for sure. Reading them, there's room for misinterpretation. It's not as much that photos lie but that people can lie with photos, and because of the objective truth-telling imbued in images captured 200,000 feet up in the air by machine eyes, they are especially ripe to be used to bolster controversial claims. In 2003 Colin Powell used satellite photos, as well as intercepted phone calls, as evidence of weapons of mass destruction in Iraq. Addressing the United Nations Security Council, the then US secretary of state insisted that the images showed chemical weapon munitions bunkers and decontamination trucks. Now we know better, of course. There were never any weapons of mass destruction. Still, satellite images aren't always untrustworthy sources. Aerial photography has been used as evidence of

ethnic violence and mass killings during the Bosnian War and, in more recent years, along the border region between Sudan and South Sudan — claims that have been more difficult to refute.

Over the past twenty-five years, satellite imagery has become more accessible. Aiming to stay competitive with other nations producing and selling their own imagery, in 1994 the Clinton administration opened up restrictions on private civilian companies in the US selling high-res images. In the years between when aerial photos of mass graves in Srebrenica were used to drum up support for NATO intervention in 1995 and when George Clooney co-founded the Satellite Sentinel Project to monitor conflict zones in 2010, the availability of satellite imagery drastically changed. In 2005, Microsoft first launched Virtual Earth (later rebranded under the Bing umbrella), offering consumers satellite imagery combined with a searchable geospatial mapping platform for free. Today, anyone with an internet connection can find an aerial shot of George Clooney's mansion in about five seconds.

This access depends on new infrastructure. The mainstream dissemination of satellite imagery adds yet another layer to the network of rockets, launch centers, signal transmitters and receivers that make views from space possible. Cloud-based mapping platforms from Google and Bing rely on data centers to store image information, another link in the data supply chain you can find traces of on the maps themselves. Google, however, has been inconsistent about when it chooses to reveal these traces.

In *Council Bluffs*, *Lithia Springs* and *Moncks Corner*, Burrington draws our attention to evidence of a policy change within Google to make information on their data centers more public as they aggressively market their cloud-based services. These lenticulars toggle between aerial images of completed storage centers and images of mounds of dirt at those same sites. Google more recently has opted to display the more up-to-date images showing the completed infrastructure sites, but their decisions to pick and choose when to show current aerial photos and when to show older imagery of data center sites, conflict zones, and areas wrecked by environmental destruction like post-Katrina New Orleans remain shrouded. One day, you wake up and the map has jumped ahead or back in time, no explanation given.

Shadows in every satellite image remind us of the limits to what aerial photos can show. Not only can they not represent everything, they can never show every time. In *Edwards Air Force Base*, the only thing that changes as the lenticular oscillates back and forth is the shadow from a jet plane abandoned in the desert, like a sundial casting time for no one. From a vantage point in the sky, the height of buildings wouldn't be legible without shadows drawn on two sides and telephone poles would melt into the landscape if it weren't for wisps of black like eyelashes stuck to the screen. Shadows give us information, but any mapping project is an attempt to represent space outside of time, abstracting it into some universal representation. In "Reconnaissance", combining lenticulars and satellite images, Burrington reminds us that these maps themselves are optical illusions.

Whitney Mallett

TIME IS A HARD DIMENSION: A CONVERSATION WITH CHARLIE LOYD

Charlie Loyd is a satellite imagery specialist and engineer working for Mapbox, an open source mapping company based in the United States. He's also an old friend and one of the smartest people I know. This conversation has been edited for length and clarity. — IB

Ingrid: We've talked before about the composite nature of satellite images, something you work with and on a lot. One interesting thing about that composite nature I've been thinking about is that to me, a satellite image doesn't feel like a snapshot. It doesn't feel like a *photograph*. It often feels a little out of time, especially when looking at a browser.

Charlie: Yeah, there's that interplay between spatial scale and time scale. It's hard to see that panoramic image and understand that it's all happening at one moment. It reminds me a little of Hogarth, the English painter of the early 1700s, or big ukiyo-e woodblock prints where you might have a triptych, and there are three different scenes all happening. You have to understand this as being a little outside time, as figurative. There's perspective distortion, but it's temporal perspective distortion. When you see a real image that's huge and in high resolution, it feels the same way, even though it really is all at once.

That's one of the amazing things about ukiyo-e to me — that it feels so photographic. The way they use frames, especially Hiroshige, to cut something. He'll just have half a building or half a person at the edge of the frame, which seems so different from: "I'm going to draw My Subject." He's trying to get at the feeling of what a moment is like.

Ingrid: I was showing the lenticulars to somebody and they kept saying there was a painterly quality to them, which was very unexpected to me. I think it was partly the particular landscapes that make up the set for the series. And also the way that you get these weird textures depending on what vantage point you're looking at it from. I guess that's more a matter of what it's like to stare really hard at a single point in an image versus trying to have the all-at-once-ness. But this technique isn't really new, either.

Charlie: There's so little rigorous thinking either in quantitative disciplines or in humanities disciplines about how to approach geographic transformation over time. I think it connects to a lot of current anxieties about time and disputes people are having about theories of change and histories and futures. That ranges in scale from personal growth and healing and concepts of what it means to transform as a person up to world-scale stuff, things like climate and environmental collapse.

Ingrid: Somewhere in between those two I think of the scale of human intervention in geopolitical scenarios. I didn't end up using them in this particular project, but I was very influenced by imagery of the conflict in Kosovo, that being one of the earliest applications of surveillance drones in a modern warfare context. There is an interesting overlap between the deliberate choice to place intervention at a high physical remove, and the continued sense that, at least for the West, that particular conflict is still kind of incoherent and illegible for even some of the actors who were participating in it.

Charlie: Absolutely. Another example is a few years ago, I think in connection with a war crimes trial, there was some imagery released of Rwanda during the genocide. I think they were ambiguous about whether it was satellite or aircraft. My guess would be aircraft just based on resolution. It's extremely confronting to see what was in Clinton's briefings — the view from above. I feel like so much of what I do professionally and as an amateur is about trying to get beyond that gut response to "Oh, it's the view from above" — Haraway's god trick. I want to say yes, let's go further, let's unpack that. But sometimes something hits you like images of a war made by someone very powerful who's very far away, and you just have to say, "Yeah, OK, that's the view from nowhere. That's the god trick."

Ingrid: One other thing about that view from nowhere is that I mostly have examples of that view being deployed by state, usually Western, power — which is limited, sure, and maybe

I'm just being cynical and US-centric, but I tend to see more of an implicit observation and/or surveillant quality to the imagery I'm more often exposed to and have access to in the US. Can you talk about some of the use cases of imaging satellites and remote sensing that don't have that quality?

Charlie: Civilian mapping is a good example, OpenStreetMap and Humanitarian OpenStreetMap Team being very good cases. That's not to say that those only have positive political potentials, of course. Mapping is a technology, it's a power multiplier, and you can't shape it perfectly to only give power to people who need more power. Sometimes you're giving power to people who should have less power. Sometimes you're mapping something in a repressive state, and what you have in mind is letting people move around their own space more ably, but what happens sometimes is that the state uses that information to do bad things. There's just no pure use of this technology any more than there is any other technology, but things like OSM and HOT give me a lot of hope.

Other things include geophysical security, so flood prediction, disaster mapping, landslides, fires, typhoons. Normally when we talk about satellite imagery in a critical context we're talking about high-res stuff, see-your-house stuff, but see-the-typhoon-stuff is sometimes much more important. Accurate weather forecasts come partly out of supercomputers but also out of modern satellites, and they're the infrastructure of infrastructure. There is so much logistics that depends on five-day forecasts, it's mind-boggling. You'd never ever think about it in the course of an ordinary day, but it's doing so much to let people not suffer and not have to over-insure their businesses and so on. That's a very quiet lack of friction.

On high-res stuff, there's potential for using satellite imagery to intervene in dramatic ways in humanitarian crises. As far as I know, no one has figured out how to do that right. It's very deep water politically and I have mixed feelings about jumping in. Not me personally, but everyone collectively — what our expectations should be here and how much preparation we should do before we start thinking that we can do that well.

Ingrid: I don't even know what well means in this situation.

Charlie: Exactly. It's going to multiply, right? If we're not doing well right now, it's questionable how much satellite imagery will help. That said, I do have this optimistic feeling that putting more facts out into the public sphere is more good than bad. It helps more than it hurts to tell people true things about the earth. But it's complicated.

Ingrid: Can you talk a bit about Landsat history? One of the things I struggle with in trying to tell the history or legacy of satellite imagery is this perhaps unfair overemphasis of the spookier or more militarized origins, and then realizing there are parallel tracks to seeing from above that are more about discovery or curiosity.

Charlie: Landsat is a series of satellites run by NASA and USGS. We're on the seventh one now, which is called Landsat 8, because the rocket carrying Landsat 6 fell into the ocean, which I can't find video of, frustratingly. It started in the early seventies, and it's a survey satellite. Instead of having high resolution and pointing specifically at areas of interest, it's pulling in virtually the entire land area of Earth. Ideally, any time it's over land and it's not completely cloudy, the sensor is on.

Landsat is about establishing baselines and seeing change. If you look at, for example, an animation of the Aral Sea disappearing, that's probably Landsat data. That's the kind of thing it's designed to do, to say, "OK, let's assume we don't know exactly what we should be looking at. Let's look at *everything* and build an archive. Then, when we figure out something is important, we can go back and look at the time series." Again, it's a way of addressing time. The super important thing about Landsat is continuity. There haven't been any gaps, so every satellite is calibrated in a chain against its predecessor.

If you're looking at very fine details of forest change because you're studying how wood-boring beetles are killing a certain number of trees, you might be looking at tiny, 1 percent reflection changes. The cross-calibration of every Landsat to

every other Landsat means that you have a good idea of what you're looking at. You have some kind of continuity of meaning across this forty-year archive.

Ingrid: There's also the moment in satellite imaging history when you start to see the emergence of privately held companies that can and do sell their imagery to the public, which seems to overlap with the declassifying of things and also with this effort to privatize Landsat?

Charlie: Yes. That was a pretty shameful chapter. Certain people in government felt that everything in the government should be as self-supporting as possible, and sold the rights to Landsat imagery to the private sector, which then sold them to the public and to scientists. The scale of that bad decision is hard to exaggerate. Landsat is really one of the most important human institutions of its scale that I know of. Very few projects that people have done for that much money and that much effort have produced so much valuable information. Treating it as a product with customers instead of a public property with citizens was a terrible, terrible mistake. There were some policy changes, and now Landsat is free the way federal government data is supposed to be. But yes, this happened towards the beginning of the commercial satellite industry.

Ingrid: There were some interesting overlaps with the commercial satellite industry and the winding down of the Cold War, right?

Charlie: So there are two basic ways you can decommission an ICBM (intercontinental ballistic missile). You can go with some arms inspectors and some technicians with screwdrivers and pull the rocket apart and turn it into fertilizer or fireworks or whatever, and turn the body of the rocket into aluminum frying pans. The arms inspector checks it off the list and says, "OK, you've decommissioned one rocket." Or, you can go to your ICBM with your weapons inspectors and your people with screwdrivers, and just unscrew the top, take out the warhead, and then say, "This is no longer an ICBM. This is a cheap launch vehicle."

The cost of launching something into space dropped precipitously through the nineties, to the point where engineering professors at large universities could easily afford to do simple satellites with their classes. If it costs $100,000 to launch something into space and you're a 400-level engineering class at Stanford, that's actually not a big deal. You have that budget. You can have your class build a tiny satellite, you can launch it on one of these not-reliable-enough-for-a-person but still fairly reliable ICBMs, and put it in space and have ham radio conversations with it.

Then when these kids graduated, of course all of them had VCs for fathers and they realized that you can do a low-end satellite for much, much, much cheaper than a high-end satellite. The top of the line commercial satellite right now, WorldView-3, costs about two-thirds of a billion dollars. If you want a satellite that takes imagery that is sharper than Landsat but still maybe a tenth as sharp as WorldView-3, you can do that for well under a million dollars, which is kind of amazing. That's a thousand-fold price decrease for a hundred-fold quality decrease.

When people did that math, start-ups cropped up, and the one that's done the most so far is Planet, formerly Planet Labs, which has a bunch of small satellites in orbit taking medium spatial resolution images, but at high temporal resolution. They are taking what are in conventional terms fuzzy images, but they're taking a lot of them. It turns out that can be pretty useful.

Ingrid: The thing about the ICBMs is really interesting partly because of the bizarre symmetry of it. In the case of Corona, the United States literally didn't know how many missiles the Russians had. They were there to verify the existence of weapons that now are being rendered obsolete, now part of the perpetuation of new imaging systems. It's vaguely ouroboros-y.

Charlie: Or take GPS, the most famous case of this strictly military technology whose primary purpose was making it easier to build cheaper weapons that would blow up Soviet military sites. Now, they're a huge part of why phones are popular. Lots of people, especially you, have already looked at this, and that pattern seems super interesting to me.

But I'm pretty skeptical of some... I feel like academics are always going to want to historicize. That's where the incentives are for an academic, to historicize something and engage in this kind of essentialism by saying, "this is its determined nature", whatever it is. I'm always skeptical of the idea that military technologies are born with this taint that makes them always military technologies, partly because that implies that it doesn't go the other way, and we know it does.

Ingrid: For me, it's useful to remember and keep those historical precedents in mind insofar as reminding myself that this is not a purely neutral instrument, or that its applications can only be one way or the other.

I'm thinking of the Ursula Franklin categories of technology, like holistic versus prescriptive. With some of these technologies, it does get fuzzy, right? Is a satellite image a holistic or a prescriptive technology? That seems to have more to do with how images are distributed.

Charlie: Yeah, and the culture or the norms and the expectations of the public who receives it. One of the things that keeps me interested in this field is that there's technical work to be done, but there's also a lot of norm-setting, that we're forty years behind on. Trying to think about what it means to have a healthy attitude toward a satellite image is such a vague question that I don't know where to start, but it seems like an important one.

For me, the thing here is transformation. That's what your project makes me think of, those mysteries, the fact that we have these really solid continuous spatial pictures, but what we have across time are infinitesimal points that we have to interpolate between. For every point on the x-axis and every point on the y-axis, there's a pixel. We've got this thickness in space, this filled-in-ness in space. But the hard dimension is time — we don't have continuity in time. What we have in time is mostly gaps. So we have these images at one instant and at another instant, but there's no movie.

When I see these things you're making I'm made to think about the mystery of what happens in the time between. This leads to larger questions: What are the potentials of technology? What are the potentials of our perception and our understanding? This mystery of, "OK, if I have a lenticular print of 1960 and 1990, is there something in the 1960 print that predicts the 1990 print?" We know there is a connection, there's a spatial connection, and every two neighboring instants between 1960 and 1990 were connected. There was some continuity, but the images don't provide it. They only ask the question, "What happened between?"

Ingrid: Or, how are all these things always collapsed onto each other? One of the reasons I like doing work around and about landscapes and going to places to document landscapes is because I like being able to encounter the collapsing of histories. When I was last in Berlin I went to the Wannsee conference house, and you go see the Wannsee house and then you see children playing in a lake and people just out on a Saturday, and then some island that King Wilhelm used to hang out at that has a castle on it — all these things appear next to each other at once. When I am going through different sets of satellite imagery, I'm very aware of that sort of collapsing of historical moments into this plane of experience, which is useful to me for avoiding falling into simplistic narratives of history by being able to understand that these are not causal connections, they are different nodes of history that are happening in the same plane. Things being adjacent to each other does not imply some sort of conspiratorial overlap but is part of remembering all of these things were happening in parallel. I often think about how to remember those moments in a world of collapsed histories, thinking about how to hold those dissonant histories in conversation with each other.

Charlie: At the largest cultural scales, we're asking questions about time and about history. I think sometimes if you look at the schoolbook world, there's this idea that people used to think of time and existence as stable and static, cyclical, always returning to the same point, and that in modernity we think of it as progressive. We're always at 3 percent growth a year, forever. Now I think we're starting to cope with the idea that it's not like that. We can't have 3 percent growth forever, and

that has to change our ideas of time — because if we're not hooked into an agricultural and religious or ritual calendar, if we don't think that there is a necessary stability to time, things get a lot more confusing and interesting. We have to have more complex ideas about allochronism and atemporality and the anthropocene, putting the things that make our lives so fast in the contexts of geological and other time. Thinking about futures, these are ways we're trying to build new practical theories of time. I suspect that in three hundred years, there will be scholars saying, "In the early twenty-first century, there was this conversation about time on all these different fronts."

Ingrid: Shifting my perspective away from urgent, twenty-first century time towards something more like geologic time is a project I struggle with — the question of whether or not the things I do constitute triage, as in work that responds to an immediate, pressing crisis, and never can move beyond that sense of perpetual crisis, or maintenance — work that does not necessarily put out the thing that is presently on fire, but maybe helps to try to mop up the buckets of gasoline that are being poured on everything. I don't know if one is more worthy or more necessary than the other at a given moment. I guess that just depends on how on fire you believe things are. Satellite imagery is funny because it is working in a hard dimension and still it does not overcome that hard dimension, but it is part of this regime of types of data that are assumed to help us leapfrog over some of those catastrophes or respond more adeptly.

Charlie: Yes, connecting these microsecond and geological scales in small ways, which are large enough to be interesting. That's something that's fascinating about the Landsat archive to me: it looks at generational scales of time. It's a year longer every year, and with luck, one day it will be century-scale. At the same time, there have been days when I've downloaded a Landsat scene from 10.30 a.m. and had it processed by a little after noon, and scrolling around on it I've noticed things, like, "Oh, there's a lot of waves up at Stinson Beach", or "there seems to be some kind of brush fire down in the Contra Costa mountains", and I've had these virtually real-time conversations with the image. But you can also think about it as an index of the anthropocene, of these huge, slow-on-a-human-scale global changes.

Do you feel like this work is one of those put the fire out right now kinds of things, or one of those move the buckets of gasoline away kinds of things? What's your time scale for this?

Ingrid: I think it operates more on the latter time scale. This project has made me think about how and where these images come from. This came up earlier, talking about that assumed Western paternalism of the satellite gaze, that someone is setting the terms of the narrative. "Someone" does not necessarily mean a person, but a corporate actor or a state.

The near-real-time thing we've talked about before — my morbid fascination with real-time as a state. There's something vaguely spiritual about it to me. It's about pursuing an existential hope that if we just know where everything is, all the time, forever and now...

Charlie: Yeah, if I could just mediate myself into the moment...

Ingrid: Much of it has to do with control over things that there actually is very little controlling for. In a way, the intentions of Corona spy satellites and Landsat have to do with those agencies' or actors' personal perceptions of time scale and what they were trying to do within that time scale or how they were trying to shape it.

Charlie: There's this giant scatter plot of when I need to know this versus how much I'm trying to control it, how scared I am of it... I don't know. There's a tricky calculus there. How do you find this changing how you look at satellite or other images?

Ingrid: I guess the way that I looked at satellite images before this tended to be to verify something. If I was looking for a data center in a particular area, or looking to check whether or not a building was probably a data center or not, you go to a satellite view. "OK, there's a lot of fans on top of this building, I'm pretty

sure I know what this is." One of the things it changes then is what I look for in those landscapes. It makes me want to look at all the other bits around the site more closely.

Charlie: How do you think about time and landscapes differently now? When you're standing in a place, do you think about its time differently than you would have since you started working on this?

Ingrid: One thing that's changed for me in the way that I think about landscape and time is how I assume that history is or isn't inscribed on those places and what that inscribing of history looks like in the world when you're standing somewhere versus when you're viewing it from this distance. Like I was saying, this assumed causality of history in landscapes, which I have become more skeptical of in the last few years.

Charlie: Makes sense.

Ingrid: I remember during Occupy Wall Street spending a lot of time looking at where different companies were located in the Financial District and trying to understand who were neighbors and what kind of grand conspiratorial lesson could be learned, and then realizing that most of the time where one hopes there is a conspiracy, there is either merely incompetence or coincidence, or just parallel existences that don't make outcomes any less malicious, but mean that where and how you direct your energy has to change. The name of the problem has to change.

R E S E A R C H

CALIBRATION

The view from nowhere doesn't emerge from nowhere, it's the result of decades of aerospace and electrical engineering research, development and maintenance. These sites are notable for their various roles in the operations and more unorthodox applications of remote sensing.

STENNIS SPACE STATION

30.386088, -89.628402
Sources: USGS, 2006 / USGS, 2014

Calibration markers, like these at the John C. Stennis Space Center in Hancock County, MS, are used to focus and determine light balance in cameras attached to aircraft and rockets. This one appears to have fallen into some disrepair over the years.

ONIZUKA AIR FORCE STATION

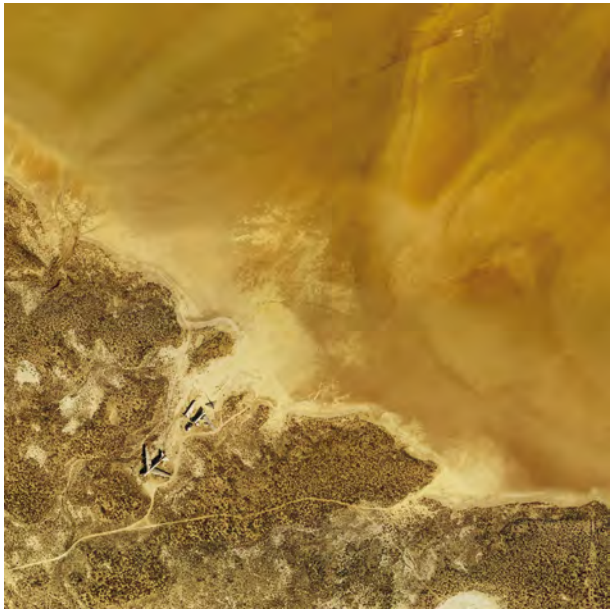
37.404435, -122.028578
Sources: USGS, 2006 / USGS, 2015

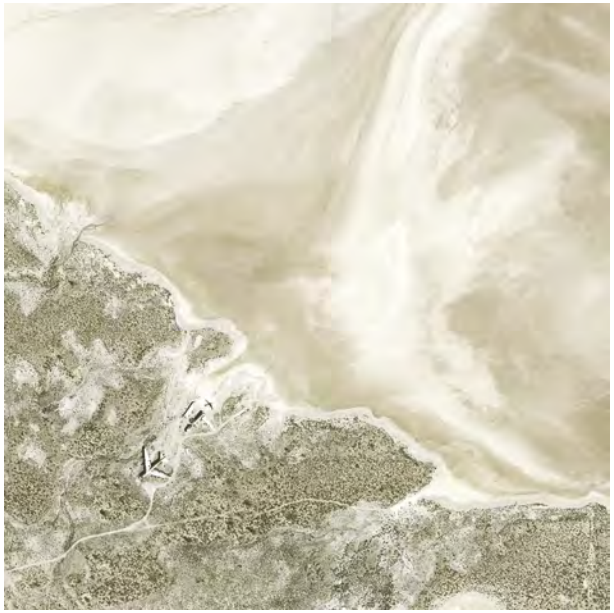
Onizuka Air Force Station (formerly the Air Force Satellite Test Center, then Sunnyvale Air Force Station) was built in 1960 to support early aerospace operations. Adjacent to Moffett Field Naval Air Station and colloquially referred to by locals as "the Blue Cube" because of the pale blue tiling on one of the station's buildings, Onizuka was the longtime home of the Air Force Satellite Control Facility, which provided core operational support to many classified reconnaissance satellite programs. The base was officially shut down in 2011 and its buildings demolished in 2014.

EDWARDS AIR FORCE BASE

34.8190015, -117.853113
Sources: USGS, 2008 / USGS, 2014

In 1991 the Strategic Arms Reduction Treaty between the United States and the USSR began the process of reducing and limiting the use of certain weapons by both countries, including "Strategic Nuclear Delivery Vehicles". One method for verifying that these weapons and vehicles had been destroyed was through the use of what the agreement called "National Technical Means" — that is, spy satellites. Weapons and aircraft dismantled or destroyed through the program would be left out in the open, visible from space for ninety days, long enough that the other side's satellites could capture an image of them. It's unclear why these two destroyed B-52s, decommissioned and destroyed presumably decades ago, remain on Edwards Air Force Base's dry lake bed, but they are a reminder of the weird role of reconnaissance not only in spying on Cold War weapons production, but in dismantling it.





CLOUDS

For better or worse, Google has done more than just about any other private company to normalize the satellite and aerial perspective through Google Maps. They've also contributed significantly to the mythologies of cloud computing, a technology that has simultaneously made it possible for the internet to become an increasingly integrated part of everyday life, and obscured the internet's material and infrastructural dimensions. Until very recently, the company was far more secretive about the locations and operations of their data centers. These three Google data centers were mostly built in the past ten years, in locations selected for their low property taxes, cheap power and water sources, and access to major fiber optic cables that make up part of the internet's backbone.

LITHIA SPRINGS

33.749734,-84.5870278
Sources: USGS, 2002 / USGS, 2014

Reporting on Google's presence in this Lithia Springs, Georgia location, down the road from a Six Flags amusement park, starts around 2004, but the data center custom built for the company wasn't constructed until 2006. It's likely their selection of the site was influenced by the existing cable infrastructure in this particular industrial park — Lithia Springs is across the street from a data center originally built in 1999 for the now-defunct hosting company Exodus Communications. In 2015, Google announced a $300 million expansion of their data centers on the property.

MONCKS CORNER

33.064257, -80.0443453
Sources: USGS, 2006 / Mapbox, 2016

Construction of this data center began in 2006 and was completed in 2007, with $600 million in expansions to the site announced in 2013. Featuring streets with names like "Efficient Way" and "Reboot Road", this data center is notable in part for the four-foot long alligator that lives in its storm water collection pond.

COUNCIL BLUFFS

41.173257, -95.802278
Sources: Google Maps, 2016 / USGS, 2014

This Google data center in Council Bluffs, Iowa has been under construction since at least 2014. As early as January 2016, Google's satellite imagery of the site showed this blurry, empty field. Rumors that Google hides or used to hide certain data centers deliberately remain mostly just rumors, but it's unclear why it continues to take so long to update imagery at this particular data center site. The site may also be home to one of Google's cloud services hosting clusters.

CRYSTALLOGRAPHY

The Dutch government apparently has requested that certain sites, primarily military bases, be removed or obscured from public satellite imagery. Google's imagery tends to feature this crystallized, Voronoi diagram-esque pattern. A CNN article speculated that this method of censorship was selected by the Dutch military and implemented by Google, although it does not resolve the fact that different imagery sources censor the site in different ways. In 2013 the Netherlands repealed a longstanding law forbidding all aerial photography over the region, and as new imagery is collected these crystallized sites have begun to be replaced.

VOLKEL AIR BASE

51.656664, 5.695424
Sources: Mapbox, 2016 / Google Maps, 2016

Originally built by the German Luftwaffe in 1943, Volkel Air Base is perhaps most notorious for its storage of American nuclear weapons (as of 2013, 22), which may be in the part of the airbase currently blacked out in Mapbox's imagery.

NATO'S JFC BRUSSNUM

50.945592, 6.00086
Sources: Mapbox, 2016 / Google Maps, 2016

One among several blurred locations in proximity to NATO's Joint Force Command Brunssum, on the border of the Netherlands and Germany. In use by the JFC since 1967, the base's primary headquarters sit atop the former infrastructure of the Dutch government-operated Hendrik coal mine.

DE PEEL AIR BASE

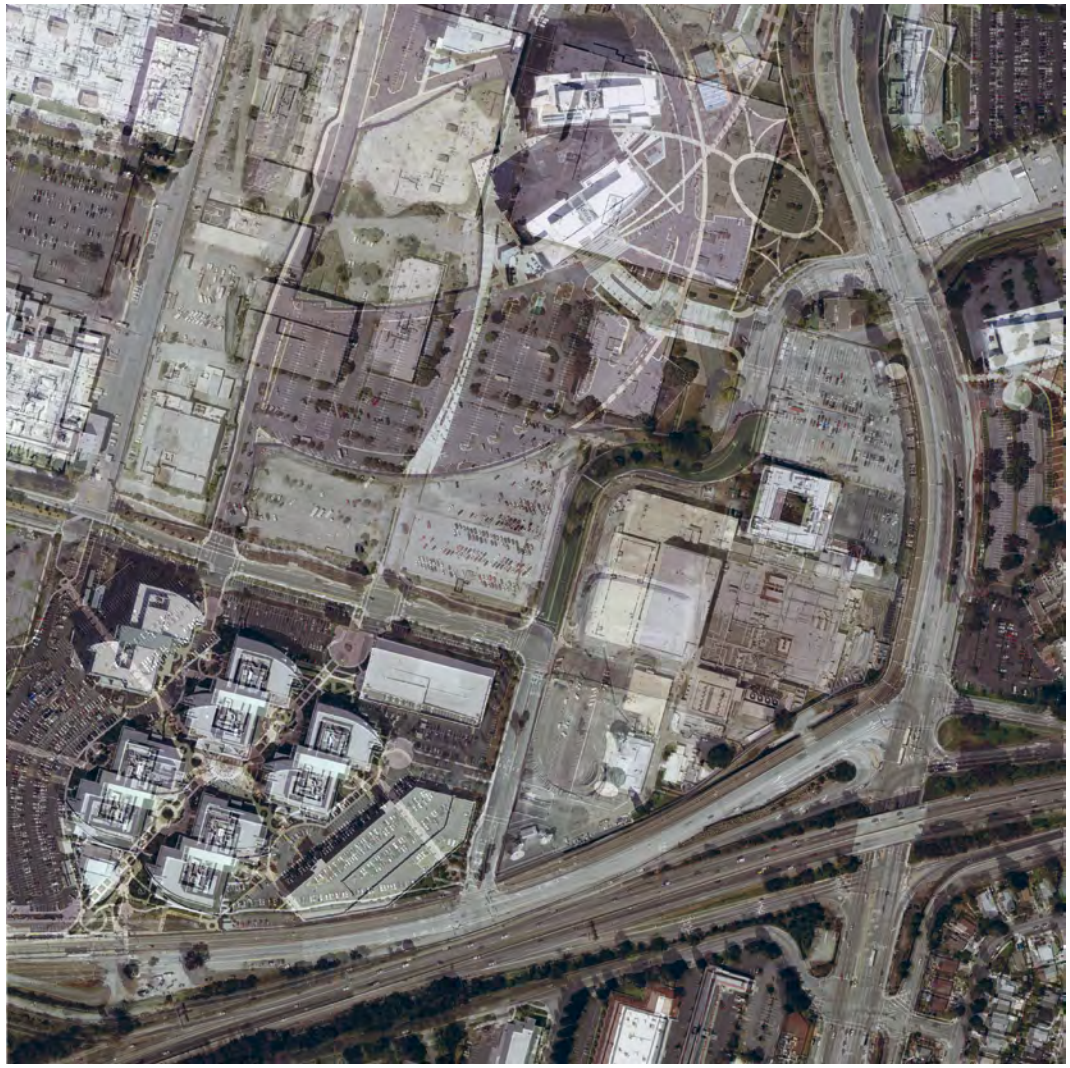
51.5196, 5.8532
Sources: Mapbox, 2016 / Google Maps, 2016

The De Peel Air Base (now known as Luitenant-generaal Bestkazerne — General Best Barracks) was built in 1954 to support operations at nearby Volkel Air Base and construct hardened aircraft shelters for the Dutch military. It's no longer in operational use as an airbase, instead serving as a guided missile base used by the Dutch army.

A R T W O R K S

Stennis Space Station (30.386088, -89.628402), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

Onizuka Air Force Station (37.404435, -122.028578), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm



Edwards Air Force Base (34.8190015, -117.853113), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

Lithia Springs (33.749734,-84.5870278), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

Moncks Corner (33.064257, -80.0443453), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

Council Bluffs (41.173257, -95.802278), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

Volkel Air Base (51.656664, 5.695424), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

NATO's JFC Brussnum (50.945592, 6.00086), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

De Peel Air Base (51.5196, 5.8532), 2016
Ingrid Burrington
Lenticular print, 100 x 100 cm

INGRID BURRINGTON

Ingrid Burrington´s artistic practice focuses on mapping, documenting, and identifying elements of network infrastructure, drawing attention to the often overlooked or occluded landscapes of the internet. By examining the geographic contexts and material realities of the network, she seeks to both demystify these technologies and to articulate the underlying politics and power dynamics of networked systems and life within an increasingly networked society. In 2015, she created *Networks of New York*, a field guide to identifying street ephemera and landmarks associated with internet and network infrastructure in New York City, where she lives. Taking a DIY, bottom-up approach, the guide focuses primarily on the quotidian aspects of the network, deciphering spray painted excavation markings, identifying antennae, and highlighting some major city landmarks of connectivity.

Ingrid Burrington was artist in residence at the Lower Manhattan Cultural Council, Eyebeam, the Center for Land Use Interpretation, and a fellow at Data & Society and writes for *San Francisco Art Quarterly*, *Creative Time Reports*, *The Nation*, and *The Atlantic*. She is a frequent public speaker, and has given talks at FutureEverything, Eyeo, dconstruct, Theorizing the Web, and the Copenhagen Documentary Festival. Burrington is a member of Deep Lab, a collective of researchers, artists, writers, engineers, and cultural producers that explores topics of control, power, and politics as they pertain to technology and society.

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Press: **Tabea Hamperl**
Design: **515 Creative Shop**
Web design: **Matteo Barbeni** and **Gorazd Gustin**

Thanks to: **Charlie Loyd, Sha Hwang, Josh Begley, Ramsey Nasser, Whitney Mallett, James Bridle Robinson Meyer, Jenny Odell, Erin Kissane and Peter Richardson, Juna Mercury Richardson Kissane** and **Allegra Guasti.**

CATALOG

Contributors: **Ingrid Burrington**, **Whitney Mallett** and **Charlie Loyd**
Graphic layout: **515 Creative Shop** and **Black Board Berlin**
Editing: **Hannah Gregory**
Published by **NOME**
Printed by **Spree Druck**, Berlin, 2016


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