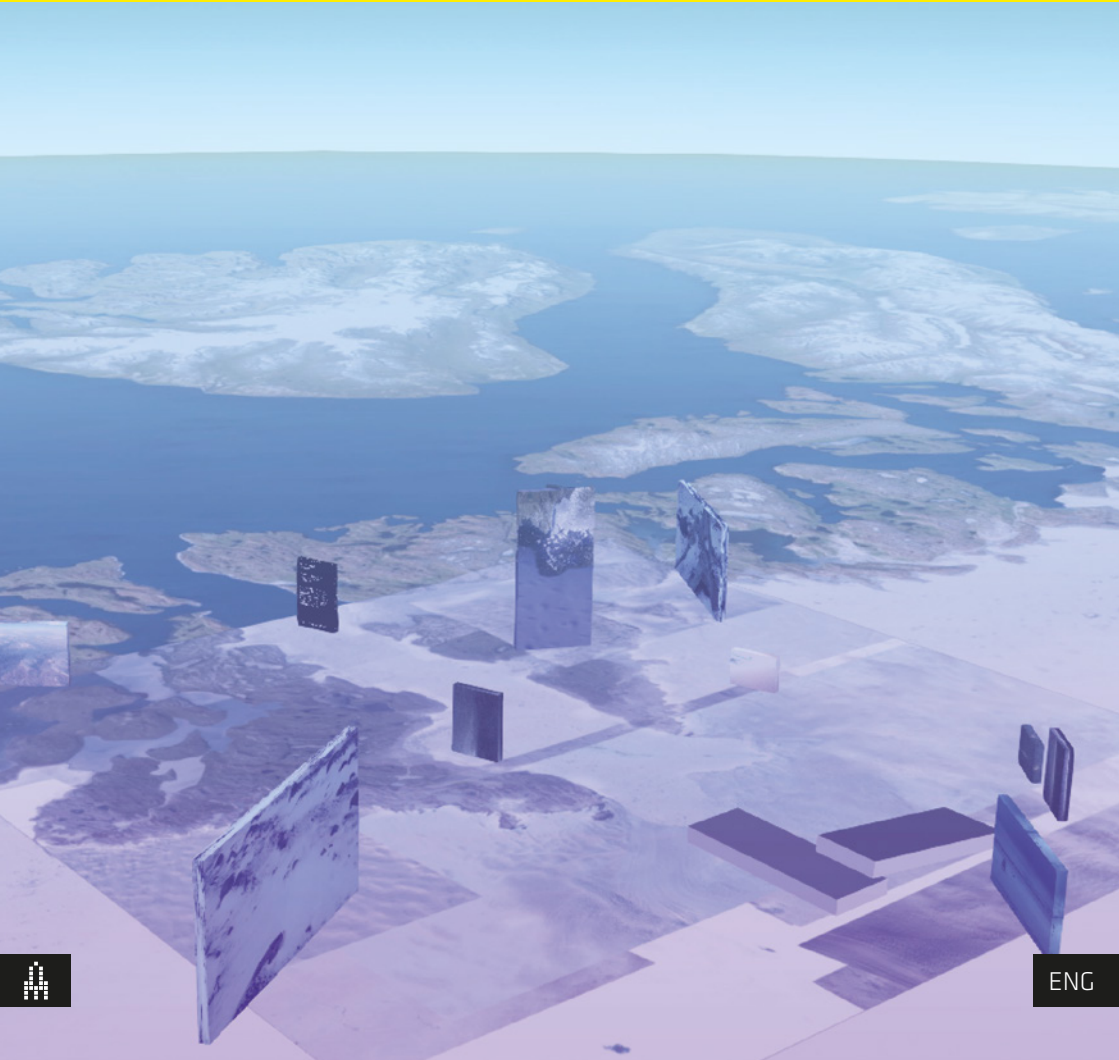


Bani Brusadin

THE FOG OF SYSTEMS



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“ What The Fog of War means is: war is so complex it's beyond the ability of the human mind to comprehend all the variables. Our judgment, our understanding, are not adequate. And we kill people unnecessarily. ”

Robert McNamara

“ Blaize smiled a little, his eyes half closed, like a dreadlocked Buddha. “Without Movement discipline,” he rumbled smoothly, “our money would flow back, like water downhill... from the Third World periphery, down to the centers of the Net. Your 'free market' cheats us; it's a Babylon slave market in truth! Babylon would drain away our best people, too... they would go to where the phones already work, where the streets are already paved. They want the infrastructure, where the Net is woven thickest, and it's easiest to prosper.”

Bruce Sterling, *Islands in the Net* (1988)

“ The Stack is powerful and dangerous, both remedy and poison. ”

Benjamin Bratton, *The Stack* (2016)

Bani Brusadin

THE FOG OF SYSTEMS

Art as Reorientation and Resistance in a Planetary-Scale System Disposed Towards Invisibility

Highways, antennas, channels, containers, storehouses, pipes, submarine cables, sensors: the word *infrastructure* usually refers to the material that supports human exchanges and the value people associate with it. They are underlying structures, carriers, pillars, which allow for the movement of stuff and bodies, ultimately making human activity possible. However, simple observation suggests that something increasingly valuable is happening not simply “above”, but also in and out, as well as in-between the so-called *infra* structures, as humans design and inhabit them in ever more convoluted ways, investing their emotions in them and using them to build world visions and expectations about the future. Take our selves, built over thousands of tiny creative actions in the realm of social media, or the growing anxieties over automation and prediction: what’s the passive “tool” and what’s the actual human “action”? Where does the subjectivation begin and where does the object end? The intensity of subjective investments in such complex constellations of objects, protocols, mediated habits and desires offers an interesting opportunity to look at these infrastructures as a whole new configuration of the world. A monstrous and fascinating construction that is made of human technologies, as well as natural resources, other lifeforms

and other forms of intentionality that may be built by humans, but whose procedures exceed the capacities of any individual.

This essay revolves around a simple observation: a new generation of artists, most of whom were raised between the end of the analogue media era and the beginning of the age of ubiquitous digital quantification, have begun to explore (sometimes in unusual ways) the vast network of infrastructures that wire the planet we inhabit. I am not talking only about communication networks, but also about the intricate mesh of systems that are increasingly responsible for uncountable aspects of people's lives, from global logistics to scientific observation and planning, from social media to police activity or waste management.

What may appear at first sight a dull territory for an artist, actually provoked a huge shift in something that lies at the core of human imagination: the balance between what can be seen and what is not immediately apparent, what is left unsaid, what is disturbingly opaque, or what is plain and simply concealed for political, economic or cultural reasons. Infrastructures compete in the definition of what is at stake in the management of planetary resources, which include human experience shaped as vast amounts of tiny data parcels to be processed and transformed into decisions. These processes are not just out of sight, but most of the time beyond the reach of our understanding, or even beyond our imagination. It has been a while since we have come to realize that networked infrastructures have become the main stage for key transformations in society, including the notions of citizenship, public space, democracy. Acting sometimes as spectral behind-the-scenes machinery, sometimes as undead, zombie entities, or as drug-like accelerators for our actions and emotions, large scale systems seem to be constantly renegotiating the notion of human agency. While the boundary between infrastructures and human subjectivity may be philosophically fuzzy, the state of emergency which permeates our society is palpable. Even before the Covid-19 pandemic we had been forced to acknowledge the collapse of natural resources and their reproduction cycles, as well as the growing sensation of ungovernability, the intimate sense of anxiety in a world with ambitious fantasies and precarious life conditions. All these phenomena are related to processes of planetary-

scale data computation in surprisingly direct ways.

Material infrastructures always implied some level of abstraction: rules and standards are simple examples of abstraction necessary for the functioning of any type of large-scale infrastructures. However, today an increasingly complex set of global infrastructures is configured to make sense of the intertwined chains of vastly different actions: at one end of the spectrum, the extraction and refinement of raw materials; at the other, human expressions, knowledge and images of the world; in the middle, the production of energy, the delivery of material and immaterial goods, and the creation and exchange of semiotic and material value. This vast range of activities is increasingly requiring distributed networks of all kinds, implying the coordination between several levels of abstraction. Individual infrastructures quickly evolved into a thicker tangle of biological and artificial systems the rules of which are either locked somewhere else, miniaturized, digitally encoded, or merely alien to basic human understanding. In this scenario, even disrupted weather patterns, the pandemic spreading of a virus, or the ambivalence of human mood, formerly identified as “natural” phenomena, become part of the planetary-scale systems and grow into apparently self-governing entities.

My argument is basically twofold. First of all, new concepts and accounts are necessary if we wish to focus on the new construction made of material resources, human-made infrastructures, people’s habits and hopes, and non-human intentionalities, both “natural” (other species, for instance) and artificial (such as gigantic data-based systems). We need new, tentative concepts to visualize the ongoing changes as well as the latent or less visible conflicts within them. These categories will naturally tend to prey upon and twist the usual boundaries between academic disciplines as well as deep-rooted concepts regarding nature (the planet is in fact becoming a hybrid sensing entity), spatiality/geography, public sphere and modern jurisdictions.

Secondly, artists, especially those challenging the most conventional formats and approaches, have started to tap into the new invisible layers of these hybrid constructions. They realize we have built powerful “lenses” with which we can observe the world, but when everything is potentially observable, where to look at and what these lenses could be used for become

political and cultural issues. If we wish to deal with the dramatic imbalance of power that is leading our civilization towards its biggest systemic crisis ever, these lenses cannot be left in the hands of large global corporations, the state bureaucratic apparatus or the military. A new generation of artists, technologists and designers has set out to build alternative narratives from their often-unpredictable research. Their work makes parts of the global machinery legible, vivid, awkward, disturbing, or merely worth exploring.

Refractions

In 2014, a journalist from the *Wired* magazine was among the first external visitors of Amazon's "fulfilment centre" in Phoenix, Arizona, one of the massive, strategically-located warehouses in which items are stored and waiting to be collected, packed, organized, and sent for final distribution.¹ In what was one of the first guided tours promoted by the giant corporation – later expanded to other facilities all across the world and open to business partners and school kids alike – Amazon was showing the new logistic landscape they had built: an array of items shelved in huge sensing structures designed in-line with computational logic. Products are not organized by type, function, or other immediately recognizable aspects, as their organisation depends on several factors such as online users' behaviour detected almost in real-time; distribution and logistics patterns; the efficiency of workers' movements as human terminals within the warehouse space; and even a flexible business model in which Amazon is able to swiftly tap into profitable market niches as an indirect producer as soon as profit opportunities are detected, basically using individual sellers as isolated risk takers that can be easily out-marketed by the corporation itself once they show success. In such a space, workers follow the instructions of autonomous systems that guide them through an operational space built by and for quantification and real-time data processing. Unfortunately, these processes are unlikely to help the workers' understanding of them, for they are aimed at controlling

¹ Wohlsen, M. (2014, June 16). A Rare Peek Inside Amazon's Massive Wish-Fulfilling Machine. *Wired*. <https://www.wired.com/2014/06/inside-amazon-warehouse/>

productivity by drastically downplaying their intelligence and, no doubt, their agency within the system.

The transformation of the urban space in the age of big data follows a similar evolutionary path. To what extent is online purchasing indirectly transforming the pace and distribution of urban traffic as hundreds of (usually self-employed) drivers run through the city following patterns that remain unpredictable to urban planners? In general, how does urban life change when an increasing number of actors are reaching decisions based on interactions with and within enclosed, heavily centralized platforms that quantify behaviours – no matter if it is travellers looking for accommodation, people choosing whom they are going to flirt with in the next 30 minutes, or autonomous vehicles reacting to real time traffic data? In such a scenario, a whole spectrum of century-long social procedures, from urban planning to unionism, are dramatically rewritten and are left with no other choice but to rely on reverse engineering or regulation, at least in this transitional phase.

And yet, the challenge is not just practical, but also conceptual: how is the very notion of human labour turning into something different when an activity such as driving – usually considered dull, low-level manual work – can now be considered as a key provider of information for training automated agents on a global scale? As a matter of fact, as human activities are being increasingly recorded and processed to improve machine learning, some traditional philosophical, political, economical and ethical notions of value are being reshaped. I guess that time and intensity both play a key role in this process. In a world in which the overload of cognitive stimuli is actually pushing people's attention towards a plethora of details and short-term reactions, the dramatic proportions of quantification and prediction procedures are actually moving towards abstraction: large scale data, pattern recognition, invisible connections between opaque management systems etc. This potential contradiction escalates when human senses and imagination rub against hybrid entities that alter the very notion of what's real. The so-called "ghost data" is a shiny example: user profiles and interactions that populate daily interfaces to mimic actual bodies or behaviours, as in the case of fake female users on dating apps or non-existing Uber cars sent out virtually

(on screens only) to fool anti-Uber police investigators.² Between the collateral effect and the structural business model, some algorithm-based phenomena seem to structurally erode the foundation of realism itself, as in the case of platform recommendations and autoplay systems. Academic researchers and journalists in mainstream media³ as well as independent researchers and artists such as James Bridle⁴ have investigated YouTube “rabbit holes” that are used as mechanisms to control people’s attention and even amplify political radicalization. Artist and writer Joshua Citarella performed field research on how the same phenomena take place on other platforms such as Instagram and TikTok.⁵ Even if Ledwich and Zaitsev⁶ suggest that more recent data may reveal different patterns and would relegate these conclusions to a specific phase in the recent history of the Internet, the structural opacity in the management of a platform such as YouTube should still be considered: social media platforms may implement corrections or play down the impact of supposedly dangerous fringes, but the role of human vs. automated moderation, the motivations behind it and the undebatable power issue behind the centralization of these huge platforms are still key factors in the funnelling of high numbers of users into specific ideas, behaviours or political identification.

Thanks to the expansion of logistics and communication networks, this process towards invisibility and abstraction – which is certainly invisible and abstract to some, but whose consequences may be quite tangible for others –

2 Wong, J. C. (2017, April 17). Greyball: How Uber Used Secret Software to Dodge the Law. *The Guardian*. <https://www.theguardian.com/technology/2017/mar/03/uber-secret-program-greyball-resignation-ed-baker>

3 Notably Tufekci, Z. (2018, March 10). YouTube, the Great Radicalizer. *The New York Times*. <https://www.nytimes.com/2018/03/10/opinion/sunday/youtube-politics-radical.html> and Roose, K. (2019, June 8). The Making of a YouTube Radical (Published 2019). *The New York Times*. <https://www.nytimes.com/interactive/2019/06/08/technology/youtube-radical.html>

4 Bridle, J. (2018). *New Dark Age: Technology, Knowledge and the End of the Future*. Verso.

5 Citarella, J. (2018). *Politigram & the Post-left*. http://joshuacitarella.com/pdf/Politigram_Post-left_2018_short.pdf and Citarella, J. (2020, September 12). Marxist Memes for TikTok Teens: Can the Internet Radicalize Teenagers for the Left? *The Guardian*. <http://www.theguardian.com/commentisfree/2020/sep/12/marxist-memes-tiktok-teens-radical-left>

6 Ledwich, M. (2019, December 31). *Algorithmic Radicalization—The Making of a New York Times Myth*. Medium. <https://mark-ledwich.medium.com/youtube-radicalization-an-authoritative-saucy-story-28f73953ed17>

is reaching a planetary scale. Again, let's observe it as a problem of perception of time and space. The extraction and pollution of natural resources is a matter of the utmost urgency for obvious reasons. And yet, it may also be understood as a long, slow war waged against non-human life forms, one that unfolded with slower temporality, a deeper pace and alongside different geometries than the rationalist, horizontal human perspective. Advocating for a geological approach to media, politics and violence, the philosopher of media Jussi Parikka wondered:

How does one speak of a slowness, especially one that registers slowly as psychological and biological damage by way of accumulated chemicals, toxic soils, and mental disorders?⁷

The response to these material and symbolic challenges demands a different approach to the one that is inherently topological, so to speak, in that it is both the result and the effect of new orientation strategies in a space whose hierarchies are profoundly "unnatural". On one side the world seems to be smaller than ever before. The overexposure on social media provokes a sense of momentary media-rich simultaneity and an apparent intimacy with people. This sense of intimacy easily expands (like a cloud, fog, a tentacle?) embracing far away things and places. Remote sensing, control and prediction tasks are being performed by increasingly simpler and smaller terminal devices that operate via smooth interfaces. They build a sort of closeness with processes that span from everyday purchases to a sense of control over your professional career as seen from your network of LinkedIn contacts. The notion of intimacy is redefined as cosy interfaces naturalize the possibility of immediately responding to market prices or climate conditions.

On the other hand, some argue that the world has not become smaller, but that it has, on the contrary, expanded to the extent where the co-existence of an almost infinite dimension cannot be fully comprehended with a cultural background rooted in the Renaissance or the Enlightenment. Artist and writer

⁷ Parikka, J. (2016). *A slow, Contemporary Violence: Damaged Environments of Technological Culture*. Sternberg Press.

Patricia Reed argued:

The proliferation of interrelations and interdependencies has, for better or for worse, ushered in a very big world. This is a world that demands more adequate frames of reference (spatial, perceptual, and linguistic) to construct orientation within and for its extensive dimensionality. The “planetary scale” serves as an initial, terminological index for this big-world condition of coexistential nth dimensionality.⁸

This “big-world condition” accessible through “unfamiliar, often opaque, and nested scales” hints at a deep cultural shift from a single spatiality based three-dimensional geometry to other types of orientation, shaped by and better suited for pattern recognition or data *navigation*, as a form of “synthetic operation” carried out by agents that are able to transcend human vision or movements, i.e. horizon-based perspectives. Here lies the hallmark of planetary-scale systems and the challenges they bring forth.

An accidental megamachine

In the 1960s Lewis Mumford envisaged that in order to understand the real nature of urban space we should look well beyond the geographical boundaries of the built urban environment and follow the traces of the metropolis along the electricity cables that connect the urban space with the distant power plants that make the very existence of cities possible. According to Mumford, bureaucracy, planning, protocols, networks are all working parts of a new complex organism, the *megamachine*. Mumford coined the term in order to describe the ever-growing process of centralising human life within technological systems and alerting to the risks of “de-skilling” human intelligence.⁹

8 Reed, P. (2019). Orientation in a Big World: On the Necessity of Horizonless Perspectives. *E-Flux Journal*, 101. <https://www.e-flux.com/journal/101/273343/orientation-in-a-big-world-on-the-necessity-of-horizonless-perspectives/>

9 See chapter 9 “The Design of the Megamachine” in Mumford, L. (1970). *The Myth of the Machine. 2: The Pentagon of Power*. Harcourt Brace Jovanovich.

In more recent times several architecture and design theorists engaged with the conceptualization of a similar issue: John Thackara's "macroscopist" approach,¹⁰ Timothy Morton's hyperobjects,¹¹ or Dan Hill's dark matter¹² all show systemic turns in design theory that are basically aimed at understanding problems that are usually treated as separate as a whole. Such a turn is relevant in that it allows conceptualizing hybrid techno-political "objects" that encompass not only infrastructures and the human decisions behind them, but also irregular connections between different systems, including elusive machine-to-machine protocols and computation processes that are hardly comprehensible to the individual's mind. These conceptual efforts are meant to take into account non-human lifeforms from the animal, vegetal, bacterial, and even mineral realms.

What should catch our attention though, is that such a system of interconnected systems looks less like a monolith than an uneven construction often built over inconsistencies, power struggles, changing political and geopolitical agreements, and even cultural expectations and delusions. Some argue that this networked system of systems can be understood by looking at its connectors: material devices and interfaces, as well as less material protocols and standards, that are designed to connect different parts while remaining unnoticed. Media theorists Matthew Fuller and Andrew Goffey call them "grey media" as they seem to work as naturalized, hence invisible, interfaces that obfuscate protocols, decisions and power relations under a coating of absolute normality:

*Vast black-boxed or obscurely grayed-out zones, taken for granted, more or less stabilizing and stabilized artifacts, that permit the abstract social relations of "frictionless" communication to take root.*¹³

10 Thackara, J. (2005). *In the Bubble: Designing in a Complex World*. MIT Press.

11 Morton, T. (2013). *Hyperobjects: Philosophy and Ecology After the End of the World*. University of Minnesota Press.

12 Hill, D. (2012). *Dark Matter and Trojan Horses: A Strategic Design Vocabulary*. Strelka Press.

13 Fuller, M., & Goffey, A. (2012). *Evil Media*. MIT Press.

<http://site.ebrary.com/id/10595605>

In this respect grey media are material tokens of what the writer Mark Fisher described as an “ideology with a missing centre”: “It is not that there is nothing there, it is that what is there is not capable of exercising responsibility.”¹⁴ Not yet, or at least not in the shape that human agency used to have. In a complex networked world, power structures, as well as material frictions and symbolic clashes, do not disappear, but may re-emerge under different guises in the “in-between”, not just the “below”, of an *infra*-structured world. And this is when observing the incessant processes of adjustment, correction, recalibration, reversing, unmaking and even refusal and sabotage, provides the keys to the understanding of infrastructures as assemblages and reimagining them against the grain.

In an essay on maintenance, design anthropologist Shannon Mattern¹⁵ claimed that the idea of “repair ecologies” counters the business-oriented concept of innovation, as well as the fashionable, yet hollow, notion of disruption. When applied to business models, the notion of disruption usually does nothing to address the structural functioning of systems, nor does it give people new opportunities to express non market-based needs. In fact, disruption is often used as a rhetorical approach to adopt new technologies that merely replace older hierarchies with newer ones. Following an approach inspired by media archaeology, Mattern holds that infrastructures should not be seen as sets of devices, but rather as complex environments in which, quoting Friedrich Kittler, “networks overlap upon other networks.”¹⁶ Mattern takes the media archaeologist approach a step further and asks: “What if we took media and network archaeology literally, and borrowed a few tricks from archaeologists of the Indiana Jones, rather than Friedrich Kittler, variety?”¹⁷

Maintenance offers an interesting vantage point for looking at infrastructural assemblages. Repair is often a challenge because contemporary systems depend – either by design or by use – on an entangled mix of technological and

14 Fisher, M. (2009). *Capitalist Realism: Is there no Alternative?* Zero Books.

15 Mattern, S. (2018, November). Maintenance and Care. *Places Journal*.
<https://doi.org/10.22269/181120>

16 Kittler, F. A., & Griffin, M. (1996). The City Is a Medium. *New Literary History*, 27(4), 717–729.

17 Mattern, S. C. (2015). *Deep Mapping the Media City*. University of Minnesota Press.

social layers, including human perceptions and habits, unevenly distributed knowledge, labour, administrative rules and so on. Ultimately – Mattern argues – repair must be understood as a multi-scale problem shaped by political, economic and cultural forces, including issues of race, gender and class. This affects the simple notion of repair as it expands and embraces practices of patching, repurposing and upcycling, far beyond the idea that maintenance means keeping something in its original state. On the contrary, repairing, fixing, adjusting are not exceptions, but the normal state of the world, in which contingent arrangements of standards and practices sustain the hybrid life of techno-social systems.

For the *Disobedient Objects* exhibition, held at the V&A Museum in London in 2014, the curators Catherine Flood and Gavin Grindon explored the long and diverse history of object-making as a part of social movement cultures. They sampled the unacknowledged grassroots production of devices and procedures that were conceived – usually with very limited resources and under duress – to clog larger social machineries such as, for instance, the urban public space. In doing so, “disobedient objects” would open up new possibilities for staging a political counter-discourse when no other channels are feasible or allowed. Disobedient objects should not be acknowledged as mere exceptions, but rather as the material manifestation of popular expertise in the understanding of infrastructures from below. A completely different side of networked systems emerges when the intentions of designers, planners, architects, security bodies are reverse engineered, twisted, or even plundered. Even more importantly, the adversarial practices of political activists observe systems as entanglements of connectors, patches and human-enforced protocols between apparently stable systems, in the hope that some of those connectors may fail or be left open for others to access. A flawed design, human behaviour or an accidental situation allow activists to pitch a completely different topology.

How can notions of grey media, permanent repair, or disobedient objects be applied to “hyper-objects” in a networked world of global data-based platforms? When it comes to thinking about the contemporary megamachine

of information and logistics we are often tempted to use metaphors such as “black box”¹⁸ or even “black chamber”¹⁹. Data scientist and whistleblower Cathy O’Neil²⁰ often stresses that when AI and big data analysis are employed to aid or even lead the decision-making processes in our society – for instance to grant us a loan or policing our neighbourhood – not merely a more efficient form of management is at stake. On the contrary, O’Neil argues that algorithms are basically sets of human tools and their design often and inevitably embeds points of view and bias. Hence, large-scale automatic data processing aimed at “managing” society and possibly predicting human behaviour should be dealt with politically. O’Neil’s argument can be summarised in three steps: 1) algorithms are mathematical tools designed and used (by people, either directly or through machine proxies) to grant the possibility of acting effectively in complex situations; 2) datasets and algorithms are basically “hyper-statistical” tools that allow us to detect patterns and reduce the margin of error; 3) they do so based on past information, which is the only knowledge that they are designed to understand, but which is obviously exposed to the very problems these systems are supposed to tackle, which is why ill designed algorithm systems tend to broaden existing gaps rather than reduce them. On a similar note, technologist Evgeny Morozov warned repeatedly that “smart” things are just a bad substitute for other, more relevant and open political processes.²¹

Global data-driven management systems should be understood as assemblages of forces in an even deeper way. In an essay on AI, the

18 Pasquale, F. (2015). *The Black Box Society: The Secret Algorithms that Control Money and Information* (First Harvard University Press paperback edition). Harvard University Press.

19 See for instance *The Black Chamber*, exhibition and catalogue curated by Eva & Franco Mattes and Bani Brusadin, produced by Aksioma – Institute for Contemporary Art (Ljubljana) and Drugo More (Rijeka) in 2016. <https://aksioma.org/black.chamber/>

20 O’Neil, C. (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. Crown.

21 Morozov, E. (2014). *Democracy, Technology and the City / Democràcia, tecnologia i ciutat*. Centre de Cultura Contemporània de Barcelona.

It’s worth noting that Morozov has recently argued for a similar, but slightly nuanced approach: “there are people out there who still think that ‘solutionism’ means opting for technology over politics, whereas what it actually means is opting for one type of technologically-mediated politics over another type.” (<https://twitter.com/evgenymorozov/status/1334981669787496450>)

philosopher Matteo Pasquinelli argues that the large quantification and prediction processes that we see at work in contemporary society are just a mechanized version of the 3000-year-long story of “algorithmic rituals” that human societies adopted in order to deal with the increasing complexity.²² And yet – Pasquinelli wrote – the emergence of a “self-computational” space in which human labour and perception are susceptible to the automation of machine learning is not the cause of the new forms of political and biopolitical control, but rather the other way around: complex systems such as machine learning and AI are emergent algorithmic procedures based on a mundane and material division of space, time, labour and social labour. However, these social and implicitly political factors are often omitted.

*What people call “AI” is actually a long historical process of crystallizing collective behavior, personal data, and individual labor into privatized algorithms that are used for the automation of complex tasks: from driving to translation, from object recognition to music composition. Just as much as the machines of the industrial age grew out of experimentation, know-how, and the labor of skilled workers, engineers, and craftsmen, the statistical models of AI grow out of the data produced by collective intelligence. Which is to say that AI emerges as an enormous imitation engine of collective intelligence.*²³

According to Pasquinelli, the very notion of artificial “intelligence” is a huge simplification that marketing and the conventional user experience design hide in plain sight as one-click usability. Discouraging curiosity brings about an awkward collateral effect: we delegate our responsibilities as persons, citizens, or society to systems and we accept that what they give us in return is “magic”. When this arrangement works, we don’t pay attention and are fast to naturalize it. When it doesn’t, it goes down the uncanny valley, often with

22 Pasquinelli, M. (2019). Three Thousand Years of Algorithmic Rituals: The Emergence of AI from the Computation of Space. *E-Flux Journal*, 101.

<https://www.e-flux.com/journal/101/273221/three-thousand-years-of-algorithmic-rituals-the-emergence-of-ai-from-the-computation-of-space/>

23 Ibid.

zany effects we laugh at nervously.²⁴ Take the thousands of funny videos on the internet on the undesired effects of digital technology, ranging from weird face filters to car accidents caused by the malfunctioning autonomous drive technology. Stripped bare to a single activation button, user interfaces move data analysis and artificial intelligence back to a very deep background. Not only can automated processes lead to dysfunctional results, reinforce inequality and injustice, but they can also distort the very notions of causality and political agency.

Design researchers Natalie Kane and Tobias Revell use the phrase “haunted machines” to investigate examples of digital and post-digital technology associated with magic, myth, and the supernatural. “During the Victorian era,” Kane argues, “the belief and practice of spiritualism reached its peak due to the anxieties and fears revolving around the technological advancements of the industrial revolution”²⁵. Similarly, our algorithmically mediated culture is full of cases of technological systems that act against us and betray the promise to unlock and enhance our inner powers (as consumers, that is). Kane and Revell show that the opposite is actually true: as many have pointed out, the less we understand about our personal technology, the easier it is to give up control and, ultimately, our rights. A very interesting aspect of the notion of “haunted machines” is that ghosts are indeed haunting the machine and getting rid of them completely may not be a good idea, if at all possible, as machine ghosts are material, coded traces of human decisions reached by the person who designed, used, or misused the machine before us:

*Technological ghosts are a constant reminder of the systems that came before, and particularly those ghost futures that we have cancelled and written over as their visions became outdated: a series of never-will-be moments. A better understanding of our capacity for haunting, may in turn allow us to better imagine the technological futures we want.*²⁶

24 On *zany* as a key aesthetic category for the contemporary see Ngai, S. (2012). *Our Aesthetic Categories: Zany, Cute, Interesting*. Harvard University Press.

25 Kane, N. (2015, May 20). Ghosts of the Future. *Cyborgology*.

<https://thesocietypages.org/cyborgology/2015/05/20/ghosts-of-the-future/>

26 Ibid.

What we have tentatively dubbed as the contemporary megamachine starts emerging as a strange conceptual object. It is an irregular operative system made of software and hardware. It is constantly adjusted, repaired and recalibrated in order to respond to different needs, not necessarily technical (obsolescence, for instance, is a condition often defined according to political or marketing parameters). It is a site of conflicts, human and more-than-human at the same time. It is vast and standardized, but sometimes inconsistent or dysfunctional; complex and pervasive, but irregular; technological, but profoundly social. In other words, within the notion of infrastructure the prefix *infra* is in a constant state of tension with the traversed *structure*.

Design and architecture theorist Benjamin Bratton proposes an extremely relevant framework that can be used to conceptualize and intervene in what he describes as the “accidental megastructure” of planetary-scale computation, or The Stack.²⁷ Articulated as a set of invisible overlapping conceptual layers, the Stack consists of a thick and often conflicting vertical accumulation of rules shaped as protocols, practical arrangements, jurisdictions etc.

*Planetary-scale computation takes different forms at different scales—energy and mineral sourcing and grids; subterranean cloud infrastructure; urban software and public service privatization; massive universal addressing systems; interfaces drawn by the augmentation of the hand, of the eye, or dissolved into objects; users both over-outlined by self-quantification and also exploded by the arrival of legions of sensors, algorithms, and robots. Instead of seeing all of these as a hodgepodge of different species of computing, spinning out on their own at different scales and tempos, we should see them as forming a coherent and interdependent whole.*²⁸

Bratton’s research focuses on the ramifications and allowances of each of the conceptual layers that articulate the Stack: the User, the Interface, the Address, the City, the Cloud and the Earth. They define a new topology of laws, frontiers and conflicts that – very roughly relate to the profiling and agency

27 Bratton, B. H. (2016). *The Stack: On Software and Sovereignty*. MIT Press.

28 Ibid.

of people (User), mediation systems (Interface), the protocols identifying both human and non-human networked agents as unique (Address), the relationship with horizontal geographies and topologies (City), the structures that tie together human geographies and jurisdictions in a new global *polis* (Cloud), and the material resources and the sources of energy (Earth).

Assuming that “the frame of the nation-state as the core jurisdiction is a design – deliberate and otherwise – of a geopolitical architecture derived from the partitioning of planar geography”, Bratton aimed to describe how such a vertical arrangement of infrastructures, practices, behaviours, flows, materials defies the modern horizontal space of Westphalian geopolitics. The invisible layers of the Stack are set in constant motion by human action and non-human interactions, redefining the scope of people’s agency, as well as the material and symbolic conflicts that shape our societies and the networked planet in general. As an accidental planetary-scale computation system, the Stack is not a static structure but rather the ever-elusive result of numerous acts of soldering, patching, translating, interfacing, syncing, calibrating, upgrading, or collapsing that include all actors involved on all levels, i.e. human beings, organizations, nation-states, corporations, machines, planetary resources, etc.

In the emergence of The Stack, it is not that the state declines per se, but that our contemporary condition is qualified both by a debordering perforation and liquefaction of this system’s ability to maintain a monopoly on political geography, and by an overbordering, manifest as an unaccountable proliferation of new lines, endogenous frames, anomalous segments, medieval returns, infomatic interiors, ecological externalities, megacity states, and more. These zones fold and flip-flop on top of one another, interweaving into abstract and violent spatial machines of uncanny jurisdictional intricacy. Borderlines are militarized as they are also punctured or ignored.²⁹

29 Ibid.

“The Stack is powerful and dangerous, both remedy and poison” – argues Bratton – but, as a model,

*The Stack is simultaneously a portrait of the system we have but perhaps do not recognize, and an antecedent of a future territory, and with both at hand, we hope to prototype the alien cosmopolitanisms these engender for us and suggest to us.*³⁰

It is both a picture and a model that depicts as well as suggests a different definition of the material and a symbolic arena in which contemporary conflicts take place. As Patricia Reed argues, planetary-scale perspective does not erase “situatedness”, on the contrary, it offers new possibilities of self-representation on a different scale.³¹ The importance of bodies and location has not disappeared. On the contrary, it is more important than ever, it has just been dramatically reconfigured. A planetary-scale computation implies a different distribution of power based on visibility/invisibility and a non-horizontal perspective³² and, in Bratton’s terms, it “perforates and transcends” the known boundaries while introducing and thickening others “at new scales and in greater quantity”.³³

Re-orientation in a horizonless world

In an early acknowledgment of Bratton’s work, the political philosopher Tiziana Terranova suggested that the Stack can be a powerful metaphor for resistant counter-power practices – the “Red Stack”, as Terranova dubs

30 Ibid.

31 Reed, P. (2019). Orientation in a Big World: On the Necessity of Horizonless Perspectives. *E-Flux Journal*, 101. <https://www.e-flux.com/journal/101/273343/orientation-in-a-big-world-on-the-necessity-of-horizonless-perspectives/>

32 See Weizman, E. (2002, April 23). *Introduction to the Politics of Verticality*. OpenDemocracy. https://www.opendemocracy.net/en/article_801jsp/

and Steyerl, H. (2011). In Free Fall: A Thought Experiment on Vertical Perspective. *E-Flux Journal*, 24, <https://www.e-flux.com/journal/24/67860/in-free-fall-a-thought-experiment-on-vertical-perspective/>

33 Bratton, 2016.

grassroots self-managed communication and financial infrastructures.³⁴ Both a description and a potential roadmap, the Stack is a powerful notion that helps us understand the creative practices of resistance and in particular the work of a new generation of artists and critical technologists.

As popular technologies are usually developed to respond to market imperatives, numerous designers, hackers, and even artists have sought an alternative, bottom-up model based on the development of popular technologies. These tools and strategies have an immediate value for oppressed minorities and social movements for human rights or against the exploitation of natural resources: for instance, secure communication infrastructures for activists, whistle-blowers, or political dissidents; direct democracy tools; visualization techniques to expose online propaganda techniques and manipulation; big data analysis used to reveal corruption; machine learning techniques that provide evidence of climate change or the illegal – and otherwise undetected – exploitation of natural resources.

However, at this point, I would like to focus on a different approach, based less on counter-design than its preconditions, as it were. Parts of the *infrastructured* world have reached us faster than our capacity to understand what they mean. Such a challenge requires quick reflexes. The scale, materiality and technical complexity of the accidental megastructure poses a challenge to human orientation that questions the very possibility of sensing – through human senses or otherwise – as well as imagining, mapping, expressing feelings or doing things together. We find ourselves in a paradoxical situation: we have built powerful “lenses” with which we observe the world, including sophisticated technologies that capture the invisible or the incredibly complex, as well as world-wide popular media as a real-time expression of human condition. And yet, when everything is potentially observable, where to look, what these lenses could be used for and how the imbalance of power is embedded in them become a political and cultural matter.

This approach takes inspiration from the provocative statement made by

34 Terranova, T. (2020). *Red Stack Attack: Algorithms, Capital and the Automation of the Common*. https://www.academia.edu/8430149/Red_Stack_Attack_Algorithms_Capital_and_the_Automation_of_the_Common

the art collective Critical Art Ensemble in 1994, who claimed that “the streets are dead capital” and that new forms of “electronic disturbance” for the age of information superhighways should be invented.³⁵ Of course, CAE believed that the issue at stake was not the supposed obsolescence of conflict in the analogue space of bodies (which is obviously not true and never will be), but rather the understanding that power and injustice were refracted, so to speak, into new structures that are not immediately detectable by human senses.

Media theorist Matthew Fuller made a similar claim when he proposed the notion of “artistic methodologies”, a phrase aimed at practices of transformation that will reconnect artistic invention with other social life forms in the grey zones in which media exist as abstract infrastructures, corporate work systems, algorithms and data structures.³⁶ Fuller included the following among these methodologies: hybrid practices such as operations of “second-order memetics”, or the intrusion into apparently spontaneous, large-scale process of knowledge dissemination; practices of the “unready”, or the “punk” and “curiously ignorant” ability to enter areas in which knowledge is secured within impregnable safes; and practices of “producing times” that offset the relationship with known objects and bodies, and relocate the normal spatio-temporal coordinates and the sense of authenticity, plausibility or causation that they bring. At times only unconventional practices across or outside of disciplinary fields are able to give a hint on how the agency can be rebuilt within the Stack, invoking the buried ghosts of past and future fantasies embedded in it. Artistic research, performances, or assemblages seem to unlock the possibility of processing the invisible layers and irregular soldering of the hybrid, accidental megastructure.

In the chapters that follow I am going to define a few basic coordinates to make sense of the ever-growing spectrum of art and design practices that 1) argue for new ways of seeing and sensing; 2) decipher systems through counter-forensic methods; 3) map non-horizontal geographies, suggesting

35 Critical Art Ensemble. (1994). *The Electronic Disturbance*. Autonomedia.
<http://critical-art.net/books/ted/>

36 Fuller, M. (2008). Art Methodologies in Media Ecology. In S. O'Sullivan & S. Zepke (Eds.), *Deleuze, Guattari and the Production of the New*. Continuum.

different narrative and orientation strategies; and 4) “perform” the Stack. These categories partly overlap and some of the examples I’m going to mention sometimes cross from one to the other. I believe that we need less waterproof scientific taxonomies than we do instigating curiosity and cross-pollination between fields and practices, so feel free to take these categories as mere vantage points from which to observe unusual types of research. As the aim of this essay is to provide a simple introduction to an evolving scene, I decided to sample predominantly well-known and well documented projects, as well as some projects I had the chance to observe at close range through my own practice as a curator and promoter of artistic research. Of course, there are many incredibly brilliant artists and projects that I have not included in this text due to a lack of space or my lack of knowledge. What I’m suggesting in this conceptual framework is that art and experimental design are capable of developing novel ways of approaching complex problems in a technologically-mediated public sphere, and that their very imperfections – which might occasionally include technological unsophistication or obsolescence – can actually incite updates, new versions, or creative imitation in the future.

Unlearning how to see as humans

Between 2007 and 2009 the geographer and artist Trevor Paglen set out to investigate the so-called extraordinary rendition flights within a broader research on the geography of secret U.S. military missions and their visual traces. In his quest he encountered dozens of secret sites, officially non-existing military satellites, ad-hoc air companies with shady headquarters and no employees, and even paradoxically flamboyant patches used as insignia for hidden, classified missions. Ghost objects and locations that barely left a trace. In order to track them down he decided to get in touch with amateur satellite spotter communities and aviation enthusiasts who spend their free time trailing planes and satellites around the globe, showing special attraction for the mysterious ones. This network of amateurs proved to be extremely effective in looking at places that anyone else would have considered void, and making sense of the tiniest detail within them.



Trevor Paglen, *Large Hangars and Fuel Storage*; Tonopah Test Range, NV;
Distance approx. 18 miles; 10:44 am, 2005

Paglen also tried to visit military locations so remote and guarded that he had no choice but to observe them from afar, sometimes from mountain tops dozens of miles away. In order to produce visual evidence of the activities within them, he had to come up with unorthodox imaging techniques that could overcome the long distance. The resulting photographs – which provided the main body of work in his *Limit Telephotography* project – frustrate the contemporary bulimic observer, accustomed to highly detailed, colour saturated, immediately readable images. Paglen’s images are blurred and require strong commitment if one wishes to decipher the unsteady shapes, grains, smudges and even pixels. While proving the existence of classified military programs and the government efforts to obfuscate them – what he called “blank spots on the map”³⁷ – Paglen was also making a point as

37 Paglen, T. (2010). *Blank Spots on the Map: The Dark Geography of the Pentagon's Secret World*. Penguin Random House.

regards the status of images that are not meant to be seen by an unaided human eye. Even when they appear to be images readable to the human eye, they are merely fragments whose familiar shapes are undecipherable. If the concept of rendition flights stirs issues of basic human rights and geopolitical jurisdiction, the visualization of its logistics seems to require visual skills way beyond documentary photography, and even a representation based on resolution and modern perspective.

The key question posed by the history of iconography and cultural critique is: What is a meaningful visual artifact (be it a portrait, an icon in a church, a TV ad, or a documentary picture)? As such, how does it work aesthetically (sensing) and pragmatically (action, individual and social)? In a landmark 1972 TV series John Berger showed that images are made by “ways of seeing” through “learned assumptions” about our body, our position in front of representations and the image making process itself. Most importantly, and following a thought current pivoting around Walter Benjamin, Berger considered the reproduction of images to be a part of a never-ending production process. The art historian W.J.T. Mitchell went one step further when he argued that the invention of a machine (the camera) to produce images based on Alberti’s artificial perspective “has, ironically, only reinforced the conviction that this is the natural mode of representation. What is natural is, evidently, what we can build a machine to do for us.”³⁸ Images suddenly emerge as “unnatural” traces – or even symptoms – of something that is happening in the *infra* space where technological systems are actively generating inputs, recording and exchanging them, and sometimes translating them so that our retina and our intelligence may be able to make sense of them. What is true for chemical photography, is all the more relevant when images are not just mechanical reactions but include sensing and interpretation procedures based on digital data.

Paglen’s early projects such as *Limit Telephotography* suggest that today’s cultural and political action requires new “ways” of technologically-mediated seeing:

38 Mitchell, W. J. T. (1984). What Is an Image? *New Literary History*, 15(3), 503.
<https://doi.org/10.2307/468718>

*Images have begun to intervene in everyday life, their functions changing from representation and mediation, to activations, operations, and enforcement. Invisible images are actively watching us, poking and prodding, guiding our movements, inflicting pain and inducing pleasure. But all of this is hard to see.*³⁹

While ethologists have studied animal vision for a long time, the idea that there are other fields of vision that are not fully human is relatively new. The term “operational image” was coined by the filmmaker Harun Farocki in his theoretical writings in the early 2000. He expanded his work with experimental documentaries and video installations, especially the *Eye/Machine* series (2001–2003).⁴⁰ Farocki focused on images that are instruments that perform tasks and carry out functions as a part of an operation, especially in the military-industrial context. Operational images are images that do not simply represent, entertain or inform but rather detect, scan, activate, oversee, identify.

Following the path opened by Farocki, Trevor Paglen went one step further. He believes that operational images do not always need us in order to be productive and they are actually used as mediators within systems that monitor or exploit human labour, or control bodies and territories. “Visual culture,” argues Paglen, “has changed form. It has become detached from human eyes and has largely become invisible. Human visual culture has become a special case of vision, an exception to the rule.”⁴¹ Nowadays an entire sensory infrastructure constantly “observes” the planet and its inhabitants, producing imagery as machine-readable pictures for other systems to interpret: surveillance, law enforcement, urban and land management, labour and production automation, weather forecasting, land and deep sea mining, social media management, user or consumer profiling, imaging and filtering etc. Sometimes images get translated for human appreciation, but in general

39 Paglen, T. (2016, December 8). Invisible Images (Your Pictures Are Looking at You). *The New Inquiry*.

<https://thenewinquiry.com/invisible-images-your-pictures-are-looking-at-you/>

40 See Farocki, H. (2002). Transversal Influences. *Traffic*, 43, 19–24 and Paglen, T. (2014). Operational Images. *E-Flux Journal*, 59.

<https://www.e-flux.com/journal/59/61130/operational-images/>

41 Paglen, 2016.

they work as technical transcriptions of data and metadata, transactional arrangements between datasets through algorithmic procedures.

Today a new generation of artists has begun to develop creative strategies with which they hope to start looking into and through things that are designed to look at us. Over a period of merely a few years a vastly diverse scene emerged, including not only key figures such as Paglen, Hito Steyerl, Metahaven, Katja Novitskova, Jill Magid, Adam Harvey, !Mediengruppe Bitnik, Aram Bartholl, Constant Dullaart, Sebastian Schmieg, Elisa Giardina Papa, Paolo Cirio, Jamima Wyman, Zach Blas, Julian Oliver, Vladan Joler, Memo Atken, Abelardo Gil-Fournier and many, many others, but also an increasing number of emerging artists and students in the fields of art, computer science, architecture and design from all over the world. Sometimes relying on the work of scholars, sometimes following non-academical, narrative, or poetic shortcuts, artists have begun to poetically misuse the existing infrastructures, looking for ways to penetrate the surveillance, logistics, or platform services, questioning the questions we ask machines. Among all automated systems, AI technologies are currently under the most intense scrutiny and experimentation, with a broad range of artists and practitioners deliberately repurposing data or turning algorithmic procedures against themselves, exposing their technical, social, or mineral layers, or even embodying the human labour necessary to make them work.

If we want to understand the invisible world of machine-to-machine visual culture, we need to unlearn how to see like humans. We need to learn how to see a parallel universe composed of activations, keypoints, eigenfaces, feature transforms, classifiers, training sets, and the like. But it's not just as simple as learning a different vocabulary. Formal concepts contain epistemological assumptions, which in turn have ethical consequences.⁴²

In fact, the management of the planetary sensorium allows for “the exercise of power on dramatically larger and smaller scales than have ever

42 Ibid.

been possible”.⁴³ Machine-readable images and automated systems bring about a full set of consequences that could be tentatively summed up as a two-fold problem of agency: on one hand, the human eye is less and less able to see what is going on in the multi-layered “operative system” that traverses societies and the planet itself. On the other hand, we are constantly training machines to see the world for us and often anticipate human perception and keep the human viewer out of the loop. Naming the world, representing it, framing specific images, using them to define ourselves have been the key aspects of human civilization, and in particular the struggles for emancipation, civil rights, the commons and self-expression. The act of seeing has always been a battleground on which what is worth observing and the material system used to define the observation itself were defined. Now the battleground seems to be shifting and the relationship between images and power is slowly moving away from its coordinates in the human, modernist visual landscape. As in most contemporary large-scale, centralized, data-based, algorithmic, networked systems, the more images are ingested by the machine-vision systems, the more accurate they become and the more influence they have on everyday life, civic life, human expectations and beliefs. Unlearning how to see like humans seems to be the first step in tapping into contemporary systemic complexity.

Deciphering new geographies: the counter-forensic approach

In ancient Rome “*forensis*” activities used to be public examinations of evidence with which a decision over a contested matter was reached. Of course, the public aspect refers to a very specific public sphere (as we would call it in modern times) restricted to the ruling elite, and in particular to the judiciary. Over the course of time, forensics came to define the adoption of scientific procedures to examine corpses or crime scenes with the purpose of bringing to light details useful in the reconstruction of a fact, usually a crime, but also in the study of the social spreading of a disease. The forensic

43 Ibid.

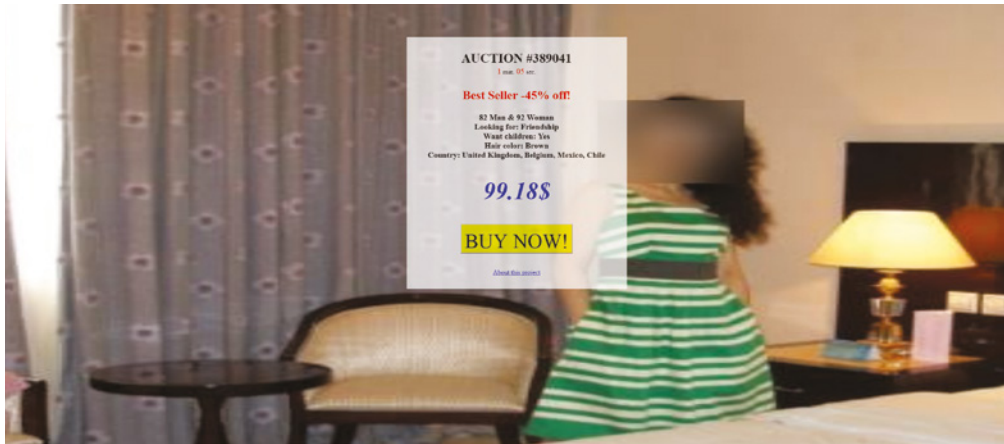
observation entails the technological observation of molecular and chemical layers of reality, as well as the traces left by objects and bodies moving through space in the past. In any case, forensic science tries to show aspects that the untrained and the technologically unaided human perception may not be able to capture. Now, the idea of counter-forensics suggests that some imbalance of power is embedded within the apparently objective forensic procedures and that alternative practices should be put in place to expose it.

When applied to a society mediated by networked infrastructures, the idea of counter-forensics may refer to two slightly different but intimately intertwined things: in a broader sense, the idea of countering the “forensic” extraction of information by the state and corporate platform owners, as an act of self-defence; in a more literal sense, counter-forensics is a set of alternative forensic procedures, carried out independently against the grain of state bureaucracies, police and armies.

The broader definition of counter-forensics considers the real-time capture of data and metadata generated by people’s behaviours as a live dissection of the social body, from which patterns and deviations from the supposed norm can be detected by the authorities. The data capturing prepares the ground for the pattern recognition, which in turn contributes to a dangerous feedback loop by reinforcing accepted cultural behaviours, extracting value and strengthening existing state and corporate hierarchies that control the privatized use of the extracted knowledge. Mapping this opaque process requires unusual methods, often ad-hoc and creative, like in the case of *The Dating Brokers*,⁴⁴ an investigation by the artist Joana Moll supported by the activist group Tactical Tech. Moll developed a clever way of exposing the intricate corporate structure behind apparently harmless dating platforms, which actually exploit and extract value from the behaviour of millions of internet users by manipulating loneliness and the human urge for love.

Counter-forensics militates against state and corporate power by mitigating the possibility of being processable by large-scale data systems. Conceived as protection for social movements against profiling through digital or

44 *The Dating Brokers*. (2018). <https://datadating.tacticaltech.org>



Joana Moll, *The Dating Brokers*, 2018

biological means, it expands the basic activist tactics of self-defence and self-awareness and often promotes a sort of voluntary obfuscation or “black transparency”.⁴⁵ This approach to counter-forensic design has been developed by critical engineers, activists and researchers, as well as by a growing scene of artists and designers who have developed creative tactics to turn the massive and indiscriminate (but often discriminatory) amassing of bio-data into a cultural and political battlefield. Projects such as Zach Blas’ *Facial Weaponization Suite*,⁴⁶ Heather Dewey-Hagborg’s *DNA Spoofing*⁴⁷ and Adam Harvey’s *CV Dazzle*⁴⁸ are seminal examples of artistic research that don’t only tackle the issue of contemporary surveillance, but expand it into a problem of *capturing*, i.e. the automatised surveillance on a vast scale in the form of processable biometric data with long-lasting “memory”. These projects reverse-engineer systems and procedures and then produce tactics that

45 This term was notably used by the art and design studio Metahaven, see Metahaven (Ed.). (2015). *Black Transparency: The Right to Know in the Age of Mass Surveillance*. Sternberg Press.

46 *Facial Weaponization Suite*. (2011-2014). Zach Blas.

<http://www.zachblas.info/works/facial-weaponization-suite>

47 *DNA Spoofing*. (2013). Heather Dewey-Hagborg.

<https://www.deweyhagborg.com/projects/dna-spoofing>

48 *CV Dazzle*. (2014). AH Projects.

<https://ahprojects.com/cvdazzle> and its recent updates (September 2019).

deliberately corrupt automatic pattern recognition, either by obfuscating data, or by over-generating them. It's worth noting that the formalization of these tactics always implies the involvement of social communities or other collective forms of engagement or symbolic resistance.



Adam Harvey, *CV Dazzle*, 2010–ongoing

Counter-forensics may consist in alternative forensic research as practiced by other means and by other actors in order to counter the imbalance of power often embedded in the way the nation-state operates against minorities. This is a more literal definition of counter-forensics which consists in a quest for unofficial, grassroots methods that would recognize fragments of citizenship or collective agency in a world in which justice, human rights, or labour are enmeshed with machine-aided decision-making processes that operate in dimensions that human senses cannot grasp nor process. The work of Forensic Architecture (and its spin-off Forensic Oceanography) is widely acknowledged as one of the most ground-breaking and methodologically complex projects of its kind. Over the course of years of academic work, legal advisory and visual production, Forensic Architecture established new approaches that investigate histories of violence over bodies and

land, such as assassinations, land occupations, torture, or unconventional warfare by observing digital and social media, and through them question the spatial and temporal coordinates of otherwise unquestioned events:

*Contemporary conflicts and human rights violations increasingly take place in urban areas, amongst homes and civilian neighbourhoods. The nature of urban war is such that parties in conflict wilfully blur the line between civilians and combatants. At the same time, those environments have become densely media-rich. The proliferation of smartphones has meant that human rights violations in conflict have never been so thoroughly documented.*⁴⁹

In cases that have been often used in court or by major media organizations (but never governments or military organizations), Forensic Architecture has developed multidisciplinary methods that dissect historical or “micro-historical” events of apparently secondary relevance into some sort of “molecular” history made of data fragments that originate from three main sources: unconventional spatial analysis, scattered digital information and oral history. Forensic Architecture’s co-founder Eyal Weizman often stresses the fact that these three aspects of their work should not be viewed separately, as they often coalesce in meaningful ways, with digital forensics sometimes acting as a trigger of repressed memories in the victims or in the observers of violence. Their reports obviously have a very specific aim, which is establishing the truth and exposing propaganda and personal interests in the forensic work carried out by the State, the military or other agents. And yet, at a more conceptual level they are also establishing a more compelling and accurate way of representing contemporary power. They do so by extruding layers of reality from a complex tangle of things, places, times, bodies and old sovereignties, contributing to account for precise human liabilities in the deployment of new types of violence and authoritarianism.

49 From the description of the *Forensic Architecture* project found at <https://forensic-architecture.org>

Exploring new geographies: a matter of junctions and scales

Drawing a map always implies locating yourself within space. And yet, as you look up and draw new frontiers between what is known and the uncharted, you are also creating a cartography of future change as possible movements and interactions through space, time, other people's lives, as well as other animal, vegetal, mineral geographies. To a certain extent the act of mapping implies the danger and the enchantment of the still unnamed, invisible, or unconnected. This might be the reason why historically maps have been made not only by official cartographers in scientific or military missions, but also by independent explorers, outcasts, visionaries. It may be for similar reasons that, more recently, artists and activists have been especially keen to draw maps of a particular kind that we could file under the category of counter-cartographies.⁵⁰

However, when it comes to the accidental megastructure of planetary-scale computation, there are several reasons why the old methods of representing horizontal, stable geographies need to be revisited: first of all, the territory to walk through is heavily distributed and its articulation not always apparent; secondly, some of its layers function from the spectrum of human perception; some are even obfuscated or hidden by design, offering resistance to those who try to observe or enter them with the wrong set of keys; and finally, the Stack and its irregular junctions provoke new types of clashes between techno-political jurisdictions, as well as cultural, legal, technical, aesthetic frictions between the various information regimes. For all these reasons only unconventional "cartographic" methodologies seem to be fit for the task. In fact, mapping these new territories mutates into something different that requires novel assemblages of different practices such as reverse engineering, social engineering, urban exploration, performance, speculative

50 See for instance the entire body of work of the Center for Land and Use Interpretation (Coolidge, M., Simons, S., & Center for Land Use Interpretation (Eds.). (2006). *Overlook: Exploring the Internal Fringes of America with the Center for Land Use Interpretation*. Metropolis Books.); the *Fadaiat* project (DeSoto, P., & Monsell, P. (2006). *Fadaiat: Freedom of Movement, Freedom of Knowledge*. Cedma-Málaga); or the collection *An Atlas of Radical Cartography* (Mogel, L., & Bhagat, A. (Eds.). (2007). (3rd print). Journal of Aesthetics & Protest Press.).

imagination, historical research, critical culture, visualization and sound. This chapter focuses on approaches that, in spite of the extreme diversity in style and objectives, have at least two common threads: first of all, they constantly zoom in and out of the territory they are mapping, both visually and conceptually, and manage to avoid the apparently objective gaze of the modernist observer, which can be found in the eye of the geographer as a colonizer, but also in many rationales based on big-data. Secondly, they dive into, instead of denouncing or distancing from, the very matter of what the megamachine is made of: the wide spectrum of time and space scales that the megamachine encompasses and exploits, from the nano-scale of chemical reactions to planetary-scale systems, from the infinitely short time of algorithmic decisions to the immense lengths of deep geological time.

At the beginning of the 2010s the artist and writer Ingrid Burrington set out to “find the internet” beyond the black screens and the graphic interfaces of our computers, with the purpose of understanding the material deployment of something that is often described by the immaterial allegory of the cloud and responding to the urgent need of technological literacy in order to understand the real challenges of contemporary technological design and its impact on the broader cultural and political debate⁵¹. Following both method and instinct, the body of Burrington’s work – which takes the shape of writing, installations and maps – leads us through a rollercoaster of data storage facilities, military IT contractors, Internet domain name auctions, awkward prison email systems or the mineral layer that makes the internet and its terminals possible. This topology is the unstable result of historical heritage, opaque technical decisions and dreams of control, as well as incongruities and cracks in apparently sealed systems.

Needless to say, even if Burrington’s explorations might recall the work of a reporter, her mix of methods and skills is very peculiar. When you don’t have access to a system, you will probably need to closely observe its behaviour, especially the apparently meaningless traces that its users leave behind. So,

51 See Burrington, I. (2016). *Networks of New York: An Illustrated Field Guide to Urban Internet Infrastructure*. Melville House.

in her quest to find the internet in the city of New York, she started on street level, looking for what is hidden in plain sight: first of all, traces of the actual network infrastructure, such as strange buildings, antennas, nondescript boxes on pavements or street lamps, cryptic manhole covers and other kinds of hardware; then, traces of human activity, such as spray-painted markings left by workers for other workers as keys for decoding the private language used to describe the location and possible interference between different systems and leaving instructions on how to operate them. The result is a book of instructions that helps to perceive what the cloud interface obfuscates.

As a metaphor, the Stack represents the actual structure of the internet much more accurately than the cloud or even the grid, but sometimes exploring its horizontal topography provides hints of its multi-layered dimension. After all, data takes up space and water, land and electricity. The cloud actually consumes earthly resources while increasingly reinforcing the asymmetries in the ownership and control over the data it is made of. In fact,

Users accept this information asymmetry in part because of a misunderstanding: they believe that the internet does not take up space and, since it doesn't take up real space, that our data isn't really somewhere else or in the hands of someone else.⁵²

In search of mundane traces of their facilities, places that remain invisible, in spite of being remotely visited every day by millions of unaware users from all over the world, Burrington later targeted Amazon and other global platforms in a series of trips throughout the U.S. The location of these facilities is often undeclared and Burrington had to track them down by following hints in local news stories about accidents or inaugurations of new highways, scanning for innocent user reviews or pins on online maps, or looking for mentions on social media. And only when, after a long trail, one finally gets to stand in front of a dull storehouse in a dull industrial area in American suburbia, does one realize

52 Burrington, I. (2014, May 20). *The Cloud Is Not the Territory*. Creative Time Reports. <https://creativetime.org/reports/2014/05/20/ingrid-burrington-the-cloud-is-not-the-territory-wnv>



Ingrid Burrington, *Networks of New York*, 2014–2016

that deciphering complex systems implies much more than conventional mapping. Finding the ties, the solderings, the stitching of layers in the Stack is at stake. Sometimes a part of them may be historically and geographically related, like in older infrastructures that were updated or repurposed to host newer technologies. Sometimes the link has economical roots, for instance in supply chains and in the exploitation of cheaper energy or available mineral resources. Sometimes there are social and cultural connections: local zoning laws, incentives to real estate, class interests and human demographics.

The practice of the reconnaissance field trip was cleverly twisted by the artist Mario Santamaría, who developed it into the fully-fledged, low-cost guided *Internet Tours*⁵³ that he has led in different European cities since 2018. Inspired by Burrington, but deeply rooted in Santamaría's own conceptual

53 Santamaría has so far developed iterations of his project in Madrid, Barcelona, Zaragoza and Bilbao, besides a few experimental tours autonomously run by students in Urbino (Italy) and elsewhere. See <https://internettour.com/> for more details.



Mario Santamaria, *Internet Tour*, 2018–ongoing

and performative practice, *Internet Tours* are based on the actual research of the local infrastructures that allow information to be constantly distributed, processed, generated, received. “Body packets” – a tongue-in-cheek term for actual human participants – embark on a properly marked motorbus that follows the trajectory of fellow data packets, but at a completely different speed. In an interesting take on Paglen’s proposition to “unlearn to see like humans”, urban geography and architecture suddenly start to provoke a different kind of gaze in the participants of the Internet tour, who are encouraged to grasp the possible traces of the invisible infrastructure of the Internet in an ordinary urban space. As the tour proceeds, a guide tells stories and anecdotes about how this infrastructure was made, including the struggles, dreams, mistakes, expectations and accidents that made it possible. As the participants are guided through suburban neighbourhoods, industrial areas, highways and even beaches, they start to realize their roles

as planners, unaware inhabitants, involuntary protagonists or merely passive content in the story of network infrastructures.

Deciphering a networked planet, especially in a phase of dramatic exploitation and collapse such as the one we are living in, requires unusual vantage points outside of the traditional boundaries of academic disciplines, artistic or activist work, or professional practices. Traditional cartographies often imply a single point of view and an ordered representation of points on a layer, as seen from above.⁵⁴ Experimental projects such as Santamaría's are intriguing because they deliberately go against the grain of conventional or documentary mapping: firstly, they highlight the hinges and junctions between layers, instead of their smoothness; and, secondly, they twist their default temporal dimension.

*For me, the history of the Internet is a process of synchronization of the world and the construction of the transatlantic telegraph cable in the second half of the 19th century is a determining moment. It meant a revolution when it came to establishing the exchange rate between different currencies such as the pound and the dollar. The Internet is a process of synchronization that integrates different devices, concepts and infrastructures.*⁵⁵

"My intention is not to investigate the way data travels," added Santamaría, "it is to move like them. To incarnate, to embody a process that is algorithmic, to get into my *trace body*." And he means it: in his earlier project *Travel to My Website* (2016) he travelled from his home in Barcelona to the server where his personal website was hosted in Bergamo, Italy. He followed the exact same route as the data and, instead of a travel agency, he planned the journey using Traceroute, an Internet traffic diagnostic tool that records the steps of a single

54 See for instance Steyerl, H. (2011). In Free Fall: A Thought Experiment on Vertical Perspective. *E-Flux Journal*, 24. <https://www.e-flux.com/journal/24/67860/in-free-fall-a-thought-experiment-on-vertical-perspective/>

55 Debatty, R. (2020, December 2). Taking Data Packets for a Ride. An interview with Mario Santamaría. *We Make Money Not Art*. <https://we-make-money-not-art.com/taking-data-packets-for-a-ride-an-interview-with-mario-santamaria/>

data packet bouncing from server to server until it reaches its destination. But where a single packet of information took about 67 milliseconds to travel from its start to its destination, it took Mario 14 days to complete the trip that led him through Switzerland, Stockholm, Milan, Perugia and finally to Bergamo. Later on, he documented this trip through notes and pictures that he published on the same website. This was a fascinating loop of transactions between a human body processing an impossible temporality and a machine that was actually designed to process human temporality – represented by traces of life: information, stories, images – hosted on a website and searched by users like me or you.

Contemporary internet architectures desperately try to embody the myth of speed and smoothness, but new imagination arises when you twist the order of internet discourse by switching the roles between bodies and data packets. Or when you search for the rare image of the Google device capturing itself in a mirror while capturing 360° images of an art museum.⁵⁶ Or when a router is configured to establish “different forms of network connectivity”, such as a “rabbit hole” in which data packets do not follow the shortest way to their destination, but try and enjoy their time within a TOR network for as long as possible.⁵⁷ Santamaría’s conceptual sculptures are unusual mapping efforts that expose normally invisible junctions and question digital infrastructures as efficient means to an end, as self-sufficient domains regulated by apparently objective protocols.

Reversing such a technocratic approach is precisely the aim of the artist and writer James Bridle, who, over the last ten years developed an impressive body of work around ingenious narrative devices shaped as art installations, unusually designed objects, essays, exhibitions and radio programs. Bridle’s projects are instantiations of invisible technological processes that redefine the space of citizenship, democracy, war and non-human life forms. His artistic

56 *The Phantom of the Mirror*. (2013). Tumblr. <https://the-camera-in-the-mirror.tumblr.com> and *Trolling Google Art Project*. (2013–ongoing). Mario Santamaría. <http://mariosantamaria.net/trolling.html>

57 See *Unfixed Infrastructures and Rabbit Holes*. (2020). Mario Santamaría. <http://mariosantamaria.net/Unfixed-infrastructures>

and design research often begins with the observation of digital systems that are designed to disappear in front of our eyes, just as the inconspicuous “grey media” that connect financial infrastructures, military technologies or surveillance strongholds. Then, this elusive tangle of historically rooted associations is unpacked as apparently simple design objects and gestures: 1:1 drone silhouettes painted or taped onto public squares in Western countries;⁵⁸ algorithmic flags as a dynamic visualization of the clash between jurisdictions when national frontiers are punctured by data flows;⁵⁹ standard architectural techniques used to render hidden sites of administration, detention, and deportation of migrants;⁶⁰ a car as the involuntary performer of a conceptual trap for a computer vision system.⁶¹

Over the last few years Bridle has given increasing importance to the connection between popular or controversial technologies and the broader ecological systems for which those technologies were developed and which – more often than not – contributed to the destruction. While he is always careful to substantiate his findings with historical references and documents, he also performs an interesting move beyond the merely documentary and towards some sort of conceptual design to disassemble and reassemble the pieces of the networked megamachine in a new way. His objects and protocols resemble acts of nonfiction design where nothing is added but everything has been slightly moved. With *Cloud Index*⁶² (2016), for instance, Bridle fed a GAN (Generative Adversarial Network) with weather patterns and voting data to eventually ask the neural network to forecast the weather depending on the possible outcome of the 2016 referendum about the UK leaving or remaining in the EU. Mapping clouds and mapping election data points to how AI is artificially trained to find correlations, not causality. Moreover, such a surreal association actually shortcuts us to the actual story of weather control, which

58 *Drone Shadows* series. (2012–ongoing). James Bridle.

<http://jamesbridle.com/works/category/drone>

59 *Citizen Ex*. (2015). James Bridle. <https://jamesbridle.com/works/citizen-ex-flags>

60 *Seamless Transitions*. (2015). James Bridle

<http://jamesbridle.com/works/seamless-transitions>

61 *Autonomous Trap 001*. (2017). James Bridle.

<http://jamesbridle.com/works/autonomous-trap-001>

62 *Cloud Index*. (2016). <http://cloudindx.com/>

James Bridle, *Drone Shadow*, 2012-ongoing

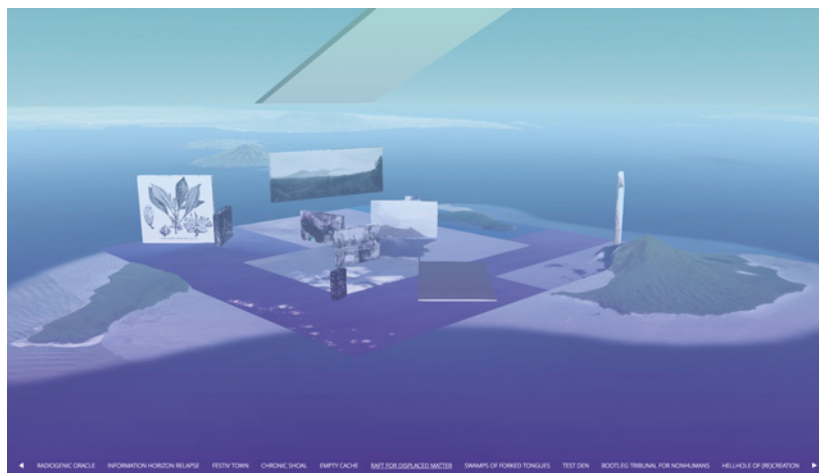


is located at the crossroads between early cybernetics, the cold war and nuclear research, leading to the current extensive use of computation to forecast weather conditions which, in a discomfiting loop, proves to be harder to achieve due to the climate instability provoked by the impact of computation itself over mineral resources and pollutant emissions in the atmosphere.

There is no need to remind the reader that the current climate catastrophe does not concern only citizens, policy makers, engineers, biologists etc., but also a whole generation of artists, designers and creative researchers. But while the most common representations of these issues on mainstream media adopt a human-centric documentary approach, rationalist visualizations and plain infographics, independent art and design research projects have been investigating alternative visualities that push those perspectives to their limits and beyond. This is by no means an unexpected move. We have already mentioned that Harun Farocki encapsulated within the notion of operational images the need to work with radically different types of images that do not merely *represent* but act within machine protocols, and whose functioning has a deep aesthetical and political impact on our society. The work by Femke Herregraven and the *Geocinema* project are more recent examples of an ever-increasing field of research in which visual arts, experimental design and critical theory of technology tend to overlap.

Geoengineering is a process of altering the surface of the planet in order to regulate it or profit from it. While large empires have been doing this for centuries by digging mines, changing the course of rivers or laying cables on the ocean bed, this has become – in the current circumstances – an increasingly contested discipline for obvious reasons. But here's the twist: inspired by science fiction and actual research on space travel, some writers and speculative designers started to adopt the term “terraforming” and look at geoengineering from a different angle. “Terraforming” usually describes the process of deliberately modifying the atmosphere, surface and ecology of a planet in outer space in order to make it habitable for the human species. But what if we projected this still hypothetical concept back to Planet Earth? Terraforming the Earth is obviously a controversial idea as it may as well

expose or promote the process of making our planet habitable once again after it became inhospitable as a result of human exploitation and the slow violence inflicted on other species and the environment. A whole new world of problems arises from this idea: who is going to terraform Earth? Is it going to be, once again, a human endeavour? What is the role of technology going to be? Whose technology? And so on.



Femke Herregraven, *Sprawling Swamps*, 2016–ongoing

Terraforming can be found at the core of the artist Femke Herregraven's *Sprawling Swamps* project (2016–ongoing).⁶³ For several years Herregraven researched the actual infrastructure of finance, inspired by the sociologist Georg Simmel's remark that "money, more than any other form of value, makes possible the secrecy, invisibility and silence of exchange".⁶⁴ She documented the material aspect of financial infrastructures, realizing how much they depended on both secrecy and control over land and sea. But a new perspective emerged when she approached a contested region as the Arctic. Here the geopolitical tensions between nation states become even

63 *Sprawling Swamps*. (2016–ongoing). Femke Herregraven.

<http://femkeherregraven.net/sprawling-swamps/>

64 Simmel, G. (1900). *The Philosophy of Money* (3rd enl. ed). Routledge.

stronger precisely because the territory itself is actually shifting due to climate change. The boundary between land and sea is unstable, as is the one between ground and underground, between the habitable and the inhabitable, or the “terraformable”, or the habitable by infrastructures such as new optic fibre cable that connects London and Tokyo a few dozens of milliseconds faster.

Blending speculative design with research, but avoiding the shortcomings of both, Herregraven’s *Sprawling Swamps* is a digital environment in which visionary infrastructural projects are developed for a whole new set of shifting locations such as ocean waves, melting ice, erupting volcanoes, shifting shorelines and sinking islands. Herregraven suggests that these locations embody the contemporary landscapes of collapsing geographies, the emergence of which reveals the contradictions and new forms of exploitation within the contemporary financial geographies. A non-documentary approach such as the one adopted in *Sprawling Swamps* goes further than mere speculative design in that it does not worry about building a consistent world and leaves open-ended possibilities. The legal framing of these literally emerging territories is complicated and contested, but it is precisely its ambiguous status that defies the (Western) cartographer’s gaze. Herregraven’s intentionally ambiguous representations question this gaze and the binary categories used in modern age jurisdictions and human exploitation, opening up new visionary possibilities of governance and resistance.

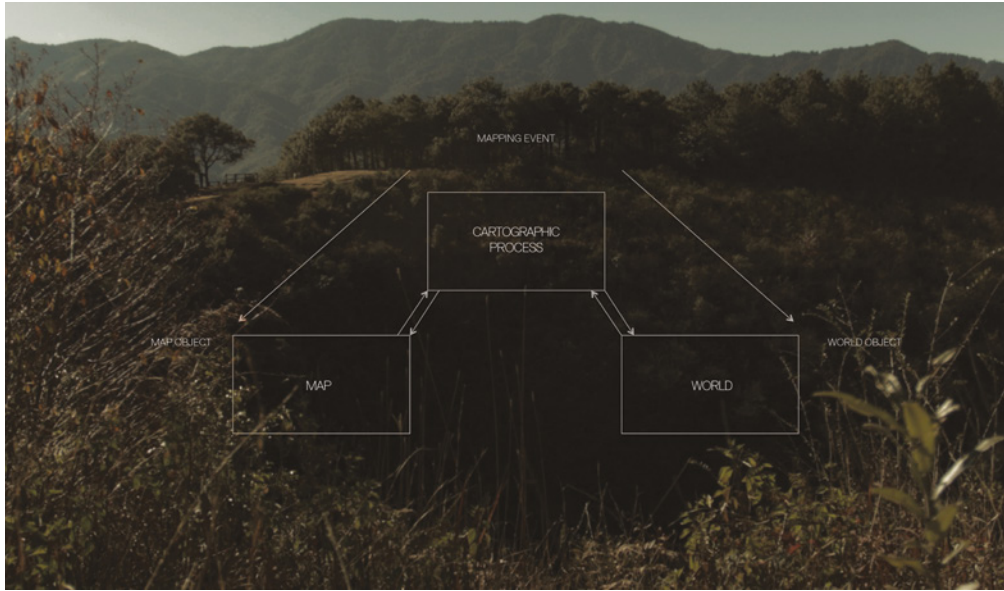
Speculative non-fiction and the exploration of new visualities are key in non-documentary approaches that develop what we previously called – after Paglen – the need to “unlearn how to see like humans”. But, after unlearning, how do we see again? In their *Geocinema* project, Asia Bazdyrieva and Solveig Suess suggest that we should try to see as a Planet, and this does not mean in a naive back to “nature” way, but rather a new challenge to represent the Earth as an irregular and contested sensing machine:

“Geocinema” considers planetary-scale sensory networks – cell phones, surveillance cameras, satellites, geosensors – as a vastly distributed cinematic apparatus: a camera. Sensing fragments of the earth their operations generate terabytes of raw data, infrastructural architectures, obscured labour, dissonant

*weather, governmental policies, scientific management, environments and situations each participating in the changing of the earth's fabric through their own sets of scales and temporalities. Here, the representation of earth is the sum of a decentralized editing process with its image anything but whole.*⁶⁵

Their recent film *Making of Earths* (2020) “acts as an investigative documentary into large-scale systems and infrastructures amid growing ecological and political anxieties”: it takes us on a journey through the cinema-globe situated in the centre of the Chinese Academy of Sciences, the Miyun and Sri Racha ground stations in Thailand, the climate research centre in Bangkok, the conference halls in the Tengchong volcanic district in Southern China and the risk-management rooms of the oil conglomerate Gazprom in Omsk, Russia. In the film, the observation, measurement and calibration processes that take place at these locations are narrated through visual fragments, historical hints and annotations, as the images and sound set out to establish a “disorientating gaze”. The refracted story of an imperial sensing apparatus suggests vast totalities, in a slightly uncanny feedback loop between distance (the far away, the unseen, the unperceivable by human sense) and intimacy – both literal and technologically mediated. The choice of locations aimed at finding traces of hyper-fast or century-long processes through which one could measure time and space in a specific territory. They are a part of a cultural and techno-political quest to quantify land and natural resources, which is sometimes part of scientific missions or environmental protection, but which often implies political interests and desire to control. As a matter of fact, new technologies of vision and measurement were developed as a prolongation of colonial extraction, to secure control of other people's land and their resources or, in later times, to gain commercial advantage through prediction models. The contemporary traces that the *Geocinema* project is after, describe new geopolitical models based on new geometries of power, image resolution, or the slow violence over people and planetary resources. Their research is documentary, but the film-making process is not, or at least

65 *Geocinema*. <https://geocinema.network/>



Geocinema, *Making of Earths*, 2020

not in the usual sense: if the earth operates as a “vastly distributed cinematic apparatus”, the challenge is to develop strategies that may understand and interpret how this apparatus actually works, which implies observing subtle processes of quantification, synchronization and adjustment within a maze of large-scale infrastructures.

Performing the Stack

Performativity is the strangest and often the most paradoxical of the artist’s strategies with which one might gain access to the complexity of the megastructure. Recurring aspects of contemporary artist performances are the artist’s or people’s bodies, sometimes aware, sometimes not; sudden variations in the pace of daily life; alterations of the rules and conventions of daily life; identity play and sometimes even fake identities, confusion, deception. Artist invention often amplifies human performativity found in fun, love, hate, labour, free time, hope, despair etc.; it may subtly add

fictional elements; or slowly mutate the trivial into something unrecognizable and vice versa. What if planetary-scale computation could be performed by occupying its spaces and bending its tempos? I don't have in mind a theatrical representation of these issues, but rather the effort to inhabit global platforms, bringing to the surface horizonless technological frameworks through bodies and, as artist Mario Santamaría would say, *trace-bodies*.

Humans seem to be struggling to find their place within the complex system of systems they “accidentally” built and that seem almost impossible to control by the billions of people who work and live within it daily. Performance appears to be an interesting way to give them the chance to live these systems differently, if only for a short time. Or it may be a tactic to stage and deliberately enhance structural injustice or hidden hierarchies via the actions of unaware users who inadvertently participate in a choreography orchestrated with the precise purpose of puncturing the invisible boundaries of the Stack.



Aram Bartholl, *Your parcel has been delivered (to your neighbour)*, 2018

Some of the projects I have mentioned use different amounts of performativity: some in a nuanced and almost personal way, such as the walks, trips and *dérives* in Bridle's or Burrington's work; some in a more explicit and playful manner, such as Santamaría's *Internet Tour*. Dozens of other extremely brilliant projects could be mentioned, amongst which some stand out with their utter simplicity and wittiness, like for instance Julian Oliver and Danja Vasiliev's *Men in Grey*,⁶⁶ Aram Bartholl's performance / installation *Your parcel has been delivered (to your neighbour)*,⁶⁷ or Nora Al-Badri and Nikolai Nelles'



Nora Al-Badri and Nikolai Nelles, *The Other Nefertiti*, 2015

66 *Men in Grey*. (2009–2014). Critical Engineering.
<https://criticalengineering.org/projects/men-in-grey/>

67 *Your parcel has been delivered (to your neighbour)*. (2018). Aram Bartholl.
<https://arambartholl.com/your-parcel-has-been-delivered-to-your-neighbour/>

Nefertiti Hack,⁶⁸ in which they seized the opportunity to semi-legally circulate a 3D scan of the ancient bust of the Egyptian queen, by which they managed to involve an extremely diverse group of people – including museum directors and online geek communities – into a public debate on digital colonialism and the politics embedded in file resolution or the digital reproduction of objects.

In my opinion the key aspect of a tentative notion of infrastructural performativity – or performing the Stack – lies in making apparent, or even accelerate, the subtle coordination of social mechanisms, individual participation and large-scale “social media” platforms. Collective rituals within a technological framework are what Eva and Franco Mattes’ collected in *My Generation*,⁶⁹ a video installation that compiles found videos of kids engaged



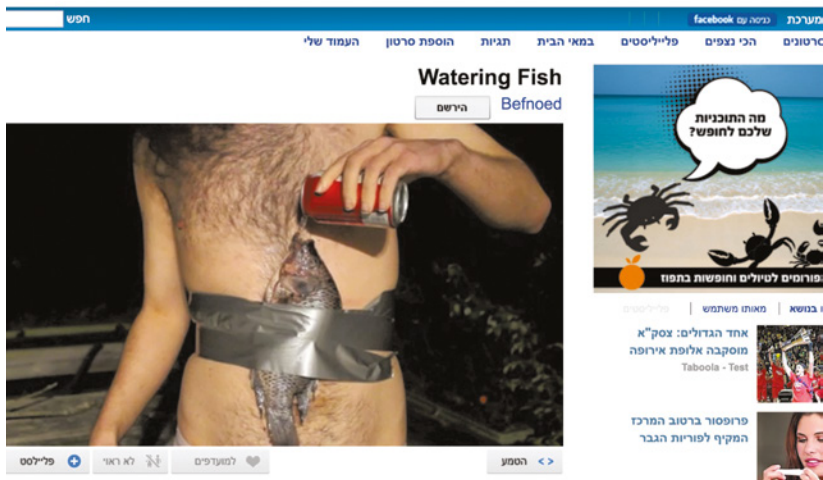
Eva & Franco Mattes, *My Generation*, 2010

68 *Nefertiti Hack*. Alloversky. <http://nefertitihack.alloversky.com>

69 *My Generation*. (2010). 0100101110101101. <http://0100101110101101.org/my-generation/>

in online gaming and smashing their devices in raging adrenaline fuelled storms. You don't need a trained sociological eye to recognise within this an awkwardly powerful connection between pleasure and hate; bodies and interfaces; screens, code and network infrastructure; and even the political economy of gaming. In these fragments of found footage we may even glimpse the ephemeral social structure built on video sharing and the heavily commercialized infrastructure that sustains it. *No Fun* is cleverly ambiguous about the source and authenticity of the original videos and leaves the door open to a subtler understanding of autonomous digital cultures, in this case young players filming and sharing themselves. The adult world often takes these videos at face value even when they are the result of a sometimes obvious, sometimes unaware, performance in a technologically mediated environment, with its own self-established rules and private codes.

Another Mattes' project, *BEFNOED*,⁷⁰ pushes all this even further, using crowdsourcing platforms to pay unknown workers to perform hilarious, weird and sometimes awkward acts, record them on their own devices and finally post them on non-mainstream, often non-US video sharing platforms. As



Eva & Franco Mattes, *BEFNOED*, 2014–ongoing

70 *BEFNOED*. (2014–ongoing). 0100101110101101. <http://0100101110101101.org/befnoed/>

crowdsourcing works mostly thanks to the time and bodies of the new global precariat, *BEFNOED* also happens to be a visualization of the asymmetrical nature of contemporary networks, to which technically most of the planet might have access, but whose economic and power structures are still heavily unfair or overtly colonial. At the same time, both the performances and the peculiar installation set-up – where images of the recorded performances are shown on impossibly located screens – engage the participants in a fun and weird game, which is probably the whole point of the project: taking the best part of the spirit of internet subcultures and using it as a connector between people, exposing and twisting the complex visualization and exploitation processes that mediate such a connection.

Performativity and uncanny rituals allow us to expose and contest not only social media, but even structures of production and logistics. An impressive case can be found in the way the Japanese artist Kota Takeuchi and the Chim↑Pom collective have been engaging with the human and environmental disaster in Fukushima, where a tsunami destroyed the cooling system of a nuclear power plant in 2011, resulting in the release of radioactive waste into the atmosphere and into the ocean. As the art curator Jason Waite pointed out regarding Fukushima, energy production is a tragic paradox, “a life-affirming resource that through its destructive by-products accelerates us toward the event horizon of collapse”.⁷¹ Over the course of several years Takeuchi and Chim↑Pom have repeatedly entered the evacuation zone both as voluntary workers as well as illegally; while in the zone, they produced a vast body of images with documentary and especially symbolic value, with simple rituals such as waving a flag or pointing the finger towards the camera with the nuclear plant in the background. Finally, together with the former inhabitants of the affected area and an international artist team, they staged an entire project – *Don't Follow The Wind*⁷² – that consisted in interventions and installations within the contaminated area: a distributed exhibition that

71 Waite, J. (2019). The Energy Paradox. *Art Papers*, 43(01).

<https://www.artpapers.org/the-energy-paradox/>

72 *Don't Follow The Wind*. (2015, 2020). <http://www.dontfollowthewind.info/>

won't be visited by anybody in decades but that picks or adds technological objects to tell stories about the material and human aspects of the disaster.



Ming Lin and Alexandra Tatarsky, *Shanzhai Lyric*, 2015–ongoing

Performing large scale structures can also be achieved with completely different methods. *Shanzhai Lyric* by Ming Lin and Alexandra Tatarsky⁷³ is a body of research around the so-called *shanzhai* fashion, the massive production of garments with misspelled or weirdly combined snippets of English words and sentences, probably taken from the internet or generated

⁷³ *Shanzhai Lyric* [@shanzhai_lyric]. Instagram.
https://www.instagram.com/shanzhai_lyric/

through loops of human or technological mediation. The aim of Lin and Tatarsky is to represent a form of “radical logistics and linguistics through the prism of technological aberration and nonofficial cultures”. The uneven, partly anonymous system of production and its unaware participants are themselves a huge collective performance that is carried out at a massive scale and that the *Shanzhai Lyric* ongoing archive slowly and patiently registers, as thousands of pictures constantly surface over social media as selfies, tourist pictures, found images, jokes, or internet memes.

The *shanzhai* aesthetic is the visible manifestation of throbbing rituals of consumerist nature that take place within a framework of global logistics – including bootleg garment manufacture in several Chinese cities and their global distribution via Beijing, Moscow, New York. The linguistic mash-ups of different realms and registers are also symptoms of consumer pleasure and a weird adaptation to an alien language, one that is thought to be fashionable under imagined conditions imposed by another culture (mostly Western). These linguistic accidents turn *shanzhai* fashion into a weird kind of poetry in a period of information overload that conveys the perception of mass production and the twisted pleasures and frustrations that it generates. This is why Lin and Tatarsky not only collect, but also perform the never stopping flow of found images and garments as a unique body of experimental poetry that can be read, printed, performed live, reproduced on other objects that can sneak back into commodity networks or even be turned into some sort of hand-made, countercultural fashion.

About anticipatory methods and incomplete maps: a conclusion

At the end of this journey one might arrive at the conclusion that the notion of infrastructure is not the right term when dealing with something much larger and complicated than a system of technical devices. Instead, a new geography emerges, that is simultaneously human and more-than-human and whose spatial and temporal coordinates only partially belong to the realm of engineering, scientific method, or biological observation. On the contrary, as we understand it as a megamachine based on different systems

of planetary-scale computation, we come to realize that we may need not only different names for it, but also different entry points into it.

Art and experimental design, especially when combined with unconventional research, suggest other ways of puncturing the boundaries of disciplinary knowledge or commercial rules. In this essay I have discussed merely a few examples of artistic methodologies that map, tour, stage, dissect, tell, visualize, tear open, restitch and embody the composite networked structure that we sometimes call our Society, sometimes the Internet, and sometimes Planet Earth. Finding alternative ways to inhabit and perform it, allows us to discover more about these infrastructures and ourselves within them. And it certainly is a preliminary step to both the understanding of the buried conflicts and figuring out how we want to “terraform” (or actually “anthropoform”) a planetary society of things and living beings.

As any attempt to map phenomena that are still in motion, this essay is limited and dramatically incomplete. Not only because this holds true for any map, but also because I decided to approach extremely complex issues through the lens of the messy field of creative practices instead of adopting a more methodical approach such as, for instance, media theory or sociology of technology. I only hinted at the connections with other research fields, such as the advocacy of global commons, digital rights and climate rights, or the much-needed debate on gender, class, or species-related issues, of which I barely scratched the surface. Needless to say, the creative and critical practices that I described are not an alternative to the actual task of designing democratic-by-design or even visionary infrastructures as an alternative to privatized algorithmic exploitation.

The value of artistic methodologies lies in how they stretch the possibilities of vision, discourse and embodiment of the techno-political issues at stake. Some artistic practices are participatory, some are *anticipatory*, skipping the established steps, taking aesthetic or political risks to explore shortcuts, or just appearing silly, crazy, irresponsible. Thus, they should be read as tactics and not as a direct means to an end. Artists facing a complex system of systems need to invoke the unexpected and the textured in order to seek orientation. They act as unruly cartographers who try to portray what resists

to be portrayed and chase a material power that lacks a fixed, humanist perspective to describe it. In fact, there is no reason to expect anything but partial evidence, fragments of stories, intuitions, or recombined objects. And yet artistic methodologies help us retrieve lost excitement and pay attention once again to – sometimes even laugh at – the ramifications and inconsistencies of the accidental megamachine and the systemic crisis it brings.

Bani Brusadin is a curator, educator and researcher based in Barcelona. He is the co-founder of The Influencers festival and the initiator of the Freeport artistic research program.

<https://theinfluencers.org>

<https://freeport.institute>

Photo credits

Femke Herregraven, *Sprawling Swamps*, 2016–ongoing

Interactive 3D environment expanding over time

Photo: Courtesy of the artist

Cover page

Trevor Paglen, *Large Hangars and Fuel Storage, Tonopah Test Range, NV; Distance approx. 18 miles; 10:44 am*, 2005

Photography. C-Print, 76.20 × 91.44 cm

From the series *Limit Telephotography*, 2005–ongoing

Copyright Trevor Paglen

Photo: Courtesy of the Artist and Altman Siegel, San Francisco

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Joana Mall, *The Dating Brokers*, 2018

Commissioned by Tactical Tech

Website screenshot

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Adam Harvey, *CV Dazzle Look 5*, 2014

Screenshot from video, 1280x720 px

New York Times Commission

Model: Bre Bitz; Hair: Pia Vivas; Makeup: Giana DeYoung

From the series *CV Dazzle*, 2010–ongoing

Photo: Courtesy of the artist

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Ingrid Burrington, *Networks of New York*, 2014–2016

Field guide to finding the internet on the streets of Manhattan

Photo: Ingrid Burrington

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Mario Santamaría, *Internet Tour*, 2018–ongoing

Zaragoza, 2019

Photo: Carlos Taberna

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James Bridle, *Drone Shadow*, Ljubljana, 2015

Urban intervention, white masking tape on asphalt, 1480x822 cm

From the series *Drone Shadow*, 2012–ongoing

Photo: Katra Petriček / Aksioma archive

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Femke Herregraven, *Sprawling Swamps*, 2016–ongoing
Interactive 3D environment expanding over time
Photo: Courtesy of the artist
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Geocinema, *Making of Earths*, 2020
Ground truth representations, each element is representing a real world object.
Volcanic district, Tengchong
Video still
Photo: Courtesy of the authors
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Aram Bartholl, *Your parcel has been delivered (to your neighbour)*, 2018
Rental bikes being retrieved from public space, dimensions variable
Import Projects, Berlin, 20–29 Jan 2018
Photo: Aram Bartholl / CC BY NC SA
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Nora Al-Badri and Jan Nikolai Nelles, *The Other Nefertiti*, 2015
3D print
Photo: Courtesy of the artists
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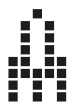
Eva & Franco Mattes, *My Generation*, 2010
Webcam videos running on computer ruin scattered across the floor, dimensions variable
Fuck the Systsem, solo exhibition, curated by Janez Fakin Janša
Match Gallery / MGML, Ljubljana, 18 Aug–9 Sep 2011
Photo: Aksioma archive
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Eva & Franco Mattes, *BEFNOED*, 2014–ongoing
Screenshot from video, 1024x576 px
Photo: Courtesy of the artists
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Ming Lin and Alexandra Tatarsky, *Shanzhai Lyric*, 2015–ongoing
Poetic research & archive
Photo: @heavensupermarket, Courtesy of Shanzhai Lyric, @shanzhai_lyric
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Bani Brusadin
THE FOG OF SYSTEMS
Art as Reorientation and Resistance in a Planetary-Scale System Disposed
Towards Invisibility

PostScript^{UM} #37
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