

FIELD NOTES FROM THE TECHNOSPHERE

INTRODUCTION

The environments in which we operate as architects are increasingly saturated with digital technologies: internet-of-things, global communication and transportation technologies, mobile devices, increased satellite coverage, location-based services, ubiquitous computing... The post-doctoral research project under the title architecture, agency and the technosphere, investigates architecture's relation with this technologically saturated environment. The three year project coincides with setting up the Field Station academic design office (ADO) at the KU Leuven Faculty of Architecture. The aim of the paper is to reflect on the ongoing and completed projects and to establish a number of frameworks for the research agenda of the post-doctoral research project and the ADO, and attempt to establish a model for understanding the technosphere. The discussion will address open questions regarding research, teaching and practice of the Fieldstation ADO.

FIELDSTATION ACADEMIC DESIGN OFFICE

Fieldstation studio was initiated by Michiel Helbig and Corneel Cannaearts in response to the challenges to architectural practice and culture posed by the technosphere and the Anthropocene. Fieldstation studio was set up in 2016 as a master studio at the Faculty of Architecture of the KU Leuven. Since 2018 it is part of an academic design office (ADO), a type of learning environment confronting research, education and practice with real-world challenges through collaboration with external partners. Fieldstation studio is a node in the international Fieldstations eV network of architects, artists, scientist and activists exploring new models for architecture in relation to the Anthropocene and the technosphere. The network consists of a growing number of local nodes, collectively it organizes workshops, exhibitions and summer schools¹ and lectures², where members discuss projects and share knowledge and engage in public debates. Field Station ADO explores what the technosphere means for architecture, a discipline both complicit in and seemingly incapable of responding to the challenges it poses.

The Fieldstation network initially had its headquarters at Teufelsberg³, an artificial hill constructed from the rubble of Berlin after the second world war, on the site of the Nazi military-technical school designed by Albert Speer, operating as the base of the NSA spy station from 1961 till 1992. As the buildings on Teufelsberg and their layered history demonstrate, architecture cannot be reduced to the constellation of material elements and is subject to environmental, technological and cultural changes⁴. The built reality is only one layer that makes up the environments we inhabit, it is embedded within other material and immaterial layers, and it contributes to larger economic, material, environmental, informational and infrastructural systems. Within the design studio, this expanded field, this constantly changing, layered and hybrid environment is seen as the context architecture operates in and actively engages with.

Fieldstation Studio aims to engage with the complex reality described above by rethinking our modes of operation and our position as architects designing embedded in this layered and hybrid environment. The studio investigates the potential of architecture as a medium to explore disrupt and raise questions rather than solving them. The studio proclaims that architects should proactively engage the complex reality of today rather than passively waiting for design briefs and projects. The design studio trains students in taking positions within contemporary fields and provides them with a platform for developing their future practice. Additional elective courses provide students with the necessary critical tools, skills and design media. The tools of choice are design fiction, spatial narratives, speculative media, imagineering, hacking and critical making. The studio operates as a collective practice, students are encouraged to actively participate in the organization and content of the studio, breaking out of the confines of academic architectural education. The studio undertakes fieldwork and actively seeks encounters with practitioners, thinkers, makers, hackers, architects and artists operating in similar fields, to exchange alternative practices, to share experiences and ideas.

The studio runs for a period of fourteen weeks, starting with a *field trip*, an intensive workshop week around midterm, and a public exhibition and debate at the finals. The brief is split into two parts: Starting from lectures, study trips, reading, presenting and discussing examples and theoretical texts, the aim of the first part

is to collectively identify, map and categorize the potential of a particular theme or urgency for architecture. In groups of three, students develop a *field guide*, focussing on a particular topic within the larger theme of the studio and explore this topic through collecting references, and designing prototypes that demonstrate its relation and relevance for architecture. In the second part, an extensive workshop introduces students to a concrete situation and site where the theme of the studio manifests itself with a certain urgency. The concepts and prototypes resulting from the first part are further developed and implemented through the confrontation with this concrete situation and the questions and potential it raises. The studio is organized in the first semester of the four-semester master program and aims to open the scope of what future architectural practice might become, as such students are free to interpret the brief in terms of scope, scale, program and strategy as a first step in developing their personal position and practice.

The studio has run for three editions each focussing on a different theme within the larger interest in architecture's position within the complex reality of today. The title of the studios so far have been *Hacking the Expanded Field of Architecture* (2016), *Shifting Borders* (2017) and *Architecture and Platforms* (2018), we are planning a studios on *Architecture and Automation* (2019) and *Precarity and Luxury* (2020). In addition to the studios the academic design office has extended its teaching activities through elective courses and developed design projects, lectures and publications.

BEYOND DICHOTOMIES

*"Among the many dilemmas with which it confronts us today is the imbrication of the human and non-human worlds. A premise of such potentially fruitful complexity calls for a radical critique of inherited dualisms such as nature and culture, subjectivity and objectivity, the animate and the inanimate, the local and the global."*⁵

Humanities lasting geological imprint on our planet requires us to rethink the dichotomies that seem fundamental in our understanding of architecture, in particular between the natural and the cultural, the designed and the found, the made and the grown. Instead of approaching these as mutual exclusive opposite poles, the Anthropocene urges us to rethink how architecture can navigate the continuum between natural and cultural. Architecture is as much producing an interiority, delimiting and claiming a portion of space for climatizing⁶, politicizing and monetising, as it is affecting the world outside. On the scale of the city the collapse of dichotomies means there is no outside any more, no wild natural hinterland ready to be urbanized, it means that the whole territory is part of city everywhere⁷, a planetary eco-technological system. While the emergence of the technosphere seems to introduce new sets of dichotomies, between digital and material, between mediated and bodily experience, between bits and atoms, it is much more fruitful to explore the productive tensions, the space in-between these opposites.

In the fieldguide *Between Natural And Artificial* students looked at the continuum between natural and artificial through the lens of landscape photography, landscape architecture and land art, artistic disciplines particularly attuned to these topics⁸. By precisely collecting of references, identifying parameters and principles at work in those references through making diagrams, they identified a continuum between the two notions, mapping the references out linearly from more natural to more artificial. They identified how these notions mutually influence each other making various kinds of hybrids, which they used to develop their personal architectural projects.

The central driving force of the emergence of the technosphere is the increasing digitalisation of every aspects of our lives. As Negroponte noticed, digital technology is so pervasive that it is only noticed through its absence⁹. Despite imagery in popular culture of clouds and data, the digital can no longer be seen as a realm separate from physical or the material. Digital technologies are having a substantial physical impact on our planet through using material resources and energy consumption for manufacturing hardware and operating vast digital infrastructures. Digital technologies are increasingly manifesting themselves in our material environments, as more and more devices become digitised and connected, but also through rewiring and disrupting existing practices of commerce, logistics, media consumption. Similarly digital technologies are increasingly informed about the material world through sensor networks, data mining, satellite imagery, mapping technologies.

The emerging data layer of the technosphere, where everything is logged, mapped out, quantified and made accessible through a plethora of services and devices. The constant stream of imagery produces both a fear of missing out, and a sense of loss of wonder, of getting lost in the world. In the *a Fieldguide to Get Lost* students collected references and produced sketch designs mapping out of how technology affords or hinders imagination. In the project *Memories From a Psycho-Neo-Geography Dérive* by Emanuela Passadore recorded three different walks using material and digital representations of the same site as triggers to get lost, a digitally mediated version of the situationist derive.¹⁰ In *Know Thy[Digital]Self*, Joel Ekelof explored his personal footprint in various online and offline worlds, using romantic paintings as a short cut to depict the unknown and wild within digital technologies, hinting at a digital sublime.

In addition to going beyond dichotomies of the natural and the cultural, the material and the digital, the grown and the made, there are others addressed within work of fieldstation studio, controlled and uncontrolled, human and non-human agency, known and unknown... In addition to exploring the potential in-between these notions, in the technosphere we see a shift occurring between different sets of dichotomies. Whereas material was associated with natural, wild, uncontrolled and digital with its opposites, we found that the contemporary situation is less clear cut or even that a reversal between these categories occurred, and digital technologies not only manifesting themselves materially, they are increasingly uncontrolled, wild.

SPHERES, STACKS AND SHIFTING BORDERS

“The shift in meaning could not be greater: once a reference to an ideal geometric figure of Euclidean space, a harmonic surface spanned by the same distance to a central point – today a functional description of a complex and integrated metabolic system, an endless circulation of energy and matter through shapeless domains, or spheres. Moreover, every one of these messy spheres intermingles with every other. Where does the gaseous atmosphere end? Where is the hydrosphere absent? Where is the planet uninfluenced by the biosphere? Where is the technosphere not at work? How do we approach, let alone construct, this paradoxical notion of a shapeless sphere, not to mention the idea of many spheres blending into one?”

Notions of the Anthropocene and the technosphere operate on timeframes and scales beyond the disciplinary focus of architecture, one approach to overcoming this might be working transdisciplinary, collaborating with scientific and artistic practices more attuned to handling these issues, another might be looking where these scales and timeframes intersect with spatial understanding, the vocabulary and toolset of architectural practice and culture. Focussing on the scale of an architectural object we might be blind for its entanglements with certain phenomena and fields, while looking on the largest scale, i.e. all of mankind, the planet as a whole, risk depoliticizing and deterritorializing the consequences of the Anthropocene and technosphere.¹¹ Within the Fieldstation ADO we aim to work on multiple scales simultaneously, we aim to use the spatial understanding present within architecture and related spatial disciplines to unravel complex contemporary phenomena through modelling, mapping and visualising.

The technosphere, as coined by Peter Half in 2014 encompassing all of humanity and human made artefacts, and thus intersecting the geosphere, biosphere, atmosphere and other spheres as defined in geology. The technosphere intermingles and interacts with other spheres, it cannot be seen in isolation but is entangled with other material and immaterial spheres or layers, which interactions are in constant flux. We use the notion of technosphere in a much narrower sense as the recent global spatial structure emerging through digital technologies, encompassing of its material infrastructures, the data and information that flows through it as well as the cultures harbours.

Stijn Colon's project titled *Fieldstation Google Earth* explored the relationship between the physical earth and google earth as its digital counterpart. Google earth is updated through lidar scans, satellite images and google street view cars, while lagging behind physical earth the refresh rate of the digital counterpart is increasing. Currently Google Earth operates as a memory for earth, but in response to the increased refresh rate, Stijn speculated on what might happen if google earth would catch up, becoming real-time, or even evolve faster than physical earth, running simulations of various potential versions of the earth simultaneously. Google earth becomes a place for imagination, a place to be colonised, a battle ground for multitude of ideas that might or might not manifest themselves in themselves physically.

Borrowing from computer science and software development, Benjamin Bratton describes this emerging superstructure as the stack¹², a vertically layered set of technologies, affording planetary scaled computation and forming a model for new forms of geopolitical governance. He identifies six layers in the stack: *earth, cloud, city, address, interface* and *user*, each with their own properties but interacting as a whole. Identifying the technosphere with as a planetary vertical organisation, displaying global flows of energy and capital, universal addressability... etc, again runs the risk overlooking horizontal differences. For instance the large tech companies that make up a substantial part of the technosphere – google, facebook, apple, amazon - they are all US based and not as present in for instance China.

Under the title *Shifting Borders*, field station studio in 2017 looked into changing conditions, liminal spaces and shifting borders that have a particular urgency today. Geopolitical borders are under pressure and shifting between dissolution or reinforcement. Our environment is increasingly mediated through digital technologies, eroding differences between material and virtual, while simultaneously giving rise to new geographies and introducing new borders. Many developing economies are growing, lowering poverty and providing social mobility for an increasingly large part of the world's population. Simultaneously it is clear that our consumption and modes of production is unsustainable depleting resources, leading to ecological crisis and ethical considerations. Architecture as a discipline has a hard time operating in response to these shifting conditions. In the

In the Fieldguide *Life in the Grey Zone* students examined grey zones in various fields affecting architectural practice and our environments. They looked into political and legal grey zones in particular, but also distinguished between grey zones in time, temporary in-between conditions, and in space, liminal and boundary spaces, across various scales. They identified potential for alternative practices and strategies for appropriation and innovation within the terrain vague of the grey zone.

The spatial structure of the technosphere can be understood through both the interaction between intermingled spheres and vertical stacks of technologie, as well as shifting borders in the horizontal and particular zones of intensity where phenomena manifest themselves with certain urgency. Rather than building a comprehensive all-encompassing model of this spatial structure, we found it to be more fruitful to approach this on project bases, seeing how sites, spatial conditions and architectural objects are entangled both vertically and horizontally.

TECHNOLOGICAL EYES

“At planetary scale, we see the formation of a vast geocinematic apparatus built from roving satellites, surveillance cameras, geosensing arrays, billions of cell phones etc, producing not one master image but multiple possible composites each of which overflows frames of perception. We have yet to really discover what kinds of cinema we can compose with this already existing apparatus - what durations, what perspectives, what contortions of narrative, what distribution of 'screens' - but the answers will define visual culture: an archive of/for an uncertain future-present.”¹³

“Visual culture has changed form. It has become detached from human eyes and has largely become invisible. The overwhelming majority of images are now made by machines for other machines, with humans rarely in the loop. The advent of machine-to-machine seeing has been barely noticed, and poorly understood by those of us who have noticed, even as the landscape of invisible images and machine vision becomes ever more active. It's continued expansion is starting to have profound effects on human life. Invisible images are actively watching us, poking and prodding, guiding our movements, inflicting pain and inducing pleasure.”¹⁴

The *Earthrise* (1968) and *Blue Marble* (1972) photographs, taken from Apollo 8 and 17 respectively, coincided with the emergence of the environmental movement and a more widespread ecological awareness¹⁵. The photographs demonstrate that our collective imagination can be drastically altered through visual media and points of view afforded by technology. Contemporary digital technologies similarly impact how we see ourselves, and understand our environment: Satellite imagery, laser scanning, the plethora of cell phone and other cameras, surveillance systems, sensor arrays, data logging, produce a constantly updating plethora of maps and images of our world.

In addition to the cold war military apparatus that produced the first images of the planet as a whole, image production and sharing has become accessible to a larger part of the population, its aggregation and propagation is still tied up in power structures. Many of these data streams are not necessarily visual in nature, they are rendered visual through screens targeting our eyes with specific imagery tailored to our personal histories and preferences. The digital nature of these technologies makes them interactive, it not just our eyes that looks at the imagery, increasingly technology is looking back, providing novel ways of seeing our world.

The *Prometheus* video is an zoom through the various scales of the of technologically saturated environments. The video is reminiscent of the *Powers of Ten*¹⁶, the film produced by Ray and Charles Eames in 1977, it traverses various scales over a number of sequences: *into the screen*, *extended bodies*, *augmented interiors*, *mediated building* and *numb city*. It was produced during the four day workshop with 90 bachelor students from the Faculty of Architecture, KU Leuven. The video is an experiment in how digital media afford collaboration, rather than story boarding and carefully setting up scenes and shots, the video is resulted from a collective and blind data logging, scanning our environments through screenshots, smart phone apps and photogrammetry. The final video is compiled and rendered on screen as a camera travel through the collected point clouds.

How does architecture, a discipline whose practice relies heavily on the visual senses respond to this novel ways of seeing and the fragmented visual culture it produces? Architects, both in practice and in academia have approached digital technologies mainly as an extension of their toolbox, developing digital means for drawing, modeling, calculating and communicating architectural ideas. Can we develop new ways of understanding and practicing architecture through the novel design media and visual culture afforded by digital technologies? Within Fieldstation studio we provide students with references of exemplary visual practices and encourage them to experiment with their own design media. In elective courses we go a step further and directly engage the question of what novel design media afford for design practice: In the *Cinematic Architecture* elective students, next to an introduction of time based media such as film and animation, focus on questions of technologically mediated vision, further developing scenarios resulting from the Fieldstation studio. In the *Computation and Materiality* elective students are introduced into coding as a design medium, developing their own design tools for mapping, modelling and visualising architecture's entanglement.

DISCUSSION: UNPACKING TECHNOLOGICAL AGENCY

Fieldstation Studio's ventures into the technosphere demonstrate that technology is increasingly influencing our environment. Digital technology is obviously human made and for the most part intentionally designed, its agency first and foremost lies with the people, corporations and governments developing and employing these technologies. However, the consequences of the large scale adoption of digital technologies, their impact on the environment, the cultural phenomena they give rise to are largely unforeseen. As such we can ascribe spatial agency to the technology itself, to the accidental emerging megastructure of the technosphere. The work of this paper is based on is diverse in scope, this paper draws some cross sections through the work looking for come themes and strategies as part of the work in progress of unpacking the spatial agency of digital technologies. Each of the frameworks proposed here - the fertile middle ground to be found when thinking beyond dichotomies; the tentative model of interaction between vertical spheres and stacks, horizontal territories and shifting borders; the novel ways of seeing and mapping technology provides and resulting visual cultures - would benefit from being developed more, both in theoretical framing and in produced work. This paper reports on a research project in progress and hopefully the feedback and discussion will provide fruitful insight for the further development of the research, teaching and practice of the Fieldstation ADO.

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¹ Several workshops and summerschools were organised: Sense, Adapt, Createe <http://fieldstations.net/sense-adapt-create/>, If This(), Then(Keephouse); <http://fieldstations.net/wekeephouse/>

² Fieldstation Berlin organises a lecture series at the Deutsches Architektur Zentrum, Michiel Helbig and Corneel Cannaearts, gave a performance lecture in this series on June 29 2019.

³ Smith, Chris L., and Benjamin Jay Shand. "Architectural Wounds: Teufelsberg." *Architecture and Culture* 4, no. 2 (May 3, 2016): 185–92. <https://doi.org/10.1080/20507828.2016.1189213>.

⁴ Anderson, Benedict. *Buried City, Unearthing Teufelsberg: Berlin and Its Geography of Forgetting*. London and New York: Routledge, Taylor & Francis Group, 2017.

⁵ Meyer, Esther da Costa. "Architectural History in the Anthropocene: Towards Methodology." *The Journal of Architecture* 21, no. 8 (November 16, 2016): 1203–25. <https://doi.org/10.1080/13602365.2016.1254270>.

⁶ Philippe Rahm architectes. *Constructed atmospheres ; architecture as meteorological design*. Edited by Massimiliano Scuderi and Philippe Rahm. Postmediabooks. Milano: Postmedia Srl, 2014.

⁷ Unknown Fields and Liam Young, eds. *Tales from the Dark Side of the City*. London: AA Publications, 2016, and Liam Young, *City Everywhere: Kim Kardashian and the Dark Side of the Screen*. Multiscreen Storytelling Performance, <https://vimeo.com/144835155>, consulted on 20/08/2019.

⁸ Matless, David. "The Anthropocenic: Landscape in the Anthropocene." *British Art Studies*, no. 10 (November 29, 2018). <https://doi.org/10.17658/issn.2058-5462/issue-10/dmatless>.

⁹ Nicholas Negroponte, *Beyond Digital*, wired Issue 6.12 | Dec 1998

¹⁰ Debord, Guy. *La Société Du Spectacle*. Paris: Lebovici, 1987.

¹¹ The naming of the new geological epoch Anthropocene has been often criticized for because it makes whole of humanity equally responsible for planetary impact.

¹² Bratton, Benjamin H. *The Stack: On Software and Sovereignty*. Software Studies. Cambridge, Massachusetts: MIT Press, 2015.

¹³ Bratton, Benjamin H. "Further Trace Effects of the Post-Anthropocene." *Architectural Design* 89, no. 1 (January 2019): 14–21. <https://doi.org/10.1002/ad.2382>

¹⁴ Paglen, Trevor. "Invisible Images: Your Pictures Are Looking at You." *Architectural Design* 89, no. 1 (January 2019): 22–27. <https://doi.org/10.1002/ad.2383>.

¹⁵ See amongst others: Buckminster Fuller, R. *Operating manual for spaceship Earth* (Clarion books). New York: Simon and Schuster, 1970, and Brand, S. *The last whole earth catalog* (Penguin books 3544). Harmondsworth: Penguin books, 1971.

¹⁶ See <https://www.youtube.com/watch?v=OfKBhvDjuj0>, consulted on 20/08/2019.