INTRODUCTION TO SUPRA SYSTEMS

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*Men in a wide array of fields were prompted to redefine the syntax of the systems they dealt with in the syntax of verbs rather than nouns—to ask "What do the systems **do**?" rather than "What are they made of?"—and then to ask the most difficult question of all: "What **should** these systems do?"*
Horst Rittel and Melvin Webber, 1973[1]

There is a problem in discussing systems only with words. Words and sentences must, by necessity, come only one at a time in linear logical order. Systems happen all at once.
Donella H. Meadows, 2008[2]

I am overwhelmed by airplanes. Every airborne trip is a powerfully visceral experience of sensation, stimulation, and the sublime—a horizontal beast of a speeding carriage - bigger than a building, roaring miles above the tangible planes of earth and sea. I have my rituals—running my fingers down the metal on the door upon entering, patting the ceiling after any strong bouts of turbulence. "You've done so well," I tell each plane when we land.
My preference for window seats is less about the view—I am, in truth, terrified of heights—and more about the ability to lean into the curvature of the fuselage and locate my small self in its huge form. Each artefact and event along the way is a gift, an offering from some larger complex place, a system

far beyond my ken—machine-readable barcodes on boarding passes; lines of regulation-yellow paint on the runways in standardised hex colours. A tall, tall tower in each airfield, full of people coaxing beasts around the sky using, until recently, software written in the decade of the first moon landing.

I mean: how are you actually meant to kick off a book about systems, a form that, as Donella H. Meadows notes, cannot be adequately described using words? I've written and rewritten this introductory chapter in so many different iterations over the past month; I've stumbled again and again whenever I've attempted to form a good, serious, critically-engaged written argument for the need—the very, very urgent need—to engage with and interrogate the politics of networked technologies through design practice. Joke's on me, lads: the words haven't submitted themselves willingly to such a task, and I'm now writing this on the morning before the final print files are meant to be sent to the publisher, hammering through on cheap coffee.

So, perhaps, let's have some rudimentary context. Networked technologies are systems, a set of things interconnected in such a way that they produce their own pattern or behaviour over time.[3] These networked technologies are increasingly present across many of our lives, manifesting in many different ways. There are three critical points to note. First, these technologies work as a *social process* that bind together their impacts on society with the governing choices made by dominant social groups.[4] Second, to paraphrase Nick Seaver, these technologies are *cultural* because they are composed of collective human practices.[5] And third, as structural forms, networked technologies have the capacity to manifest potentially systemic, invisible, and intersectional forces that act through social structures and institutions.[6]

More context: to try to get a grip on how the politics and power swirling around these networked technologies manifest, my colleagues and I have founded *Supra Systems Studio* (SSS), hosted in the Design School at London College of Communication, University of the Arts London. This book marks the launch of SSS at London Design Festival 2018; together with the opening of an exhibition, *Everything Happens So Much*, which explores the all-at-once nature of systems; and the debut of a multi-performance installation work called *Supra Systems: Office Rites* at the Victoria and Albert Museum, in which the cult and ritual of Bacchanalia are manifested through digital, data-driven, automated, and algorithmic decision-making processes in a mundane office setting.

As I've been hauling together the exhibitions and the studio, I've been churning through an enormous range of works that could be loosely described as the canon of this field, in order to strengthen make the case that SSS needs not only to exist but also to operate through design practice.

New institutes and programmes such as the AI Now Institute in New York and the Ada Lovelace Institute in London have made impassioned pleas for the fields of machine learning and artificial intelligence to move past technical framings around emergent arrays of data-driven technologies, in order to draw on disciplines that prioritise "human contexts, experiences, and socio-political issues". [7]

Scholars in science and technology studies (STS) have been grappling with the co-constitution of power, materiality, technology, and society for so long, analysing how social interpretations of problems give meaning and physical form to particular technologies[8]; how "technology" operates as a network of power populated by humans, machines, and other actants. Artists and designers have engaged critically for over a century with the networked systems and two-way real-time transfer of information (see, for example, Vladimir Tatlin's *Monument to the Third International*, or Dada, De Stijl, Bauhaus). Systems theory, too, has been around for several decades, developing through the work of the RAND Corporation and gaining influence in the deployment of networked technologies by the United States Armed Forces during the Cold War.[9] These militarised systems, described metaphorically as the "closed world", are uncanny harbingers of the centrally-controlled power apparatuses currently populating our domestic, commercial, and civic spaces with networked widgets and artefacts."

Words, words, words. Whilst these works offered deep and critical insight, nothing quite seemed to *stick* or get under my fingernails — not like the smell of burnt plastic from a laser-cutter or the frantic sweat of a looming deadline. But I stumbled across the foundations of a possible framework in *Thinking in Systems* by Donella H. Meadows, who was not only reporting on systems operations but actually getting to grips — instinctually, elegantly, practically — with ways to do work on systems on their own terms.

At its core, *Thinking in Systems* argues that in order to discuss systems properly we must use a language that "shares some of the same properties as the phenomenon under discussion". [10]

"At a time when the world is more messy, more crowded, more interconnected, more interdependent, and more rapidly changing than ever before, the more ways of seeing, the better." [11]

Published in 2008, *Thinking in Systems* seems like a timely response to the groundswell of networked digital technologies making their way into the world in the wake of increasing Internet speed, saturation, and infiltration into other media and spaces. In reality, Meadows wrote the manuscript in 1993, drawing on systems analysis of the past thirty years, since the height of

the Cold War. Her analysis is not based on the interpretation of a given system in light of its context in human history; in her approach, systems *are* the context.

Thinking in Systems is filled with visual representations—graphs, diagrams, flowcharts—and elegant literary metaphors that propel the reader across the structure and terrain of the system. Our existing mental models are not sufficient to help us comprehend the complications of the real world. Whilst systems happen all at once, they reveal themselves as a series of events over time and in surprising ways. Not satisfied with an exclusively technical framing, Meadows moves us into a realm of affect, intention, sensation, and aesthetic form. "You can see all parts of a picture at once," she says while asking us to consider what it means to feel and experience our way through these assemblages, which transcend the human lifespan, scale, and sensory faculties.

I fell hard for *Thinking in Systems*—not only for its theoretical insight but also for its generosity of spirit. Meadows asks us to approach complexity with care and humility. She opens up questions rather than shutting down answers. As she says:

"I don't think the systems way of seeing is better than the reductionist way of thinking. I think it's complementary, and therefore revealing. You can see some things through the lens of the human eye, other things through the lens of a microscope, others through the lens of a telescope, and still others through the lens of systems theory. Everything seen through each kind of lens is actually there. Each way of seeing allows our knowledge of the wondrous world in which we live to become a little more complete." [12]

There is a brute pragmatism at play here. Certainly, there are many other calls to find ways and modes of parsing the complexities around systems such as networked technology and climate change.[13] In relation to these directives, Meadows states, "I am interested in analysis only when I can see how it helps solve real problems." [14]

This statement is echoed in one of the first pieces developed for this book, a conversation with Sara Hendren of Olin College in which we pawed over the tension between committing to an idea in the form of practice and tearing that idea apart as a form of provisionality. As Sara states:

"Thinking in principles is really quite different from getting shit done. In some issues, you're not just materialising, you're materialising in a world where it's eventually going to have to be delivered. Maybe that's scalability, maybe it's not—but it's going to have a life…That's the difference between designers and

armchairs philosophers, for whom first principles are simple ways of thinking. It's harder for designers to hang onto them—not because they forget, but because of the commitment and provisionality."

Supra Systems responds to and extends *Thinking in Systems* in exploring the experience, articulation, and interrogation of networked technologies and systems. This book contains many deeply personal, reflexive pieces in which the authors—designers, artists, curators, writers, academics, and researchers—look at their own lives, works, emotions, and practices in order to draw out the interplay of affect, structure, behaviour, aesthetics, and intent necessary to engage with (or at least make a pass at) complex systems.

Section I: Experience opens with **Shannon Mattern** pondering those spaces of force and flow that make things happen. Articulating the peculiar quality of systems—the spatiotemporal scale that makes them imperceptible to the constituents in their sphere of influence—Mattern asks how we feel our way through. **Natalie Kane** goes from reflecting on growing up online, to maintaining—even more, demanding—emotional vulnerability in the face of platform capitalism. "'We are becoming aware of what it means to place ourselves in networks, to reckon with edgeless spaces," she writes, "and yet we still choose to enter them headfirst". **Ewa Winiarcyzk** also explores affect and emotion in online networked space, unpicking how emotional labour and social risks play out in the online sex work known as "camming". Finally, **Sara Hendren** explores the unfolding of systems in engineering, design, and arts education; the dance between provisionality and commitment; the possibilities of rehearsing those relationships; and the practice of humility in interdisciplinary work.

In *Section II: Articulate*, our authors explore ways of investigating the structures and politics of complex systems and argue for the necessity of a historical perspective in doing so. No matter how shiny the technology or groundbreaking the narrative, there is no *tabula rasa*, only long, entangled histories and layers of stuff.[15] Interrogating the notion of objectivity in the popular perception of data, **Wesley Goatley** unpacks the influence of photography on scientific documentation under the premise that technology would remove the subjectivity of the human hand. Drawing on his own practice, he argues for a critical data aesthetics that reveals the constructed interpretations underlying the representation of the phenomena in question. **Luisa Charles** also reflects on her own practice as a filmmaker, studying how systems and structures frame and filter the creative process, and debating whether they are forms of creativity in their own right. Like Sara Hendren, **Joel Karamath** runs a studio for undergraduate design and creative practice; in conversation, he discusses the meaning of future-facing technology; the benefits of developing pedagogy beyond the constraints of a single

discipline; and the joys of skip-diving as a way of bringing defunct technology into the classroom. **John Fass** and **Alistair McClymont** draw a link between, on one hand, the depiction and recognition of lemons in seventeenth-century Dutch still life paintings, and on the other hand, the observation of images and "recognition" of the objects they portray by computer vision systems. Finally, **David Benque** situates the almanac in a historical trajectory culminating in today's big data systems; he reflects on his artistic construction of a contemporary almanac as a way of challenging our faith in predictive algorithms and complicating our polarised understanding of future forecasting as whimsical superstition or infallible scientific calculation.

As interlude, a visual work by **Paul Bailey** contemplates the instabilities of our self-locating between place and space, reading and watching, alluding to the idiosyncrasies of scale and form in which systems manifest.

Systems are surprising, Meadows reminds us. But through intent and intervention we can pull out and poke at their unexpected qualities. **Alistair McClymont** launches *Section III: Interrogate* by kicking against both artistic and scientific systems of work to question how his own practice embodies and communicates a phenomenon — but, equally, how his practice conceptually challenges and unites the conceptual divide between art and science by developing multiple artefacts across different realms. In mourning for the progress bar, **Oliver Smith** asks what we learn when something dies. By looking under the bonnet of seemingly frictionless user interfaces, he deconstructs the progress bar's attempts to be an "accurate representation of the chaotic, unpredictable nature of computers and their users". In his essay on speedrunning — the art of finishing a video game as quickly as possible — **Tobias Revell** takes on the notion of the system itself. Looking back on a long history of gamers exploiting the "glitches, cuts, tricks, shortcuts, and hacks" built into the very constitution of a video game, he argues that speedrunning offers us new ways to interact with systems, to "play the playing of the game". Finally, to conclude this book, **Molly Wright Steenson** makes a case for embracing the unexpected. She argues that in networked technologies' unexpected and unwelcome responses to being poked –– offer us ways of understanding the boundaries and permeability of machine learning and artificial intelligence.

1 Ritter, Horst W.J., and Webber, Melvin M. (1973). Dilemmas in a general theory of planning. Policy Sciences, 4/2, pp155-169.

2 Meadows, D.H. (2008). Thinking in Systems: A Primer. London: Chelsea Green Publishing.

3 Ibid.

4. Edwards, P. (1997). The Closed World: Computers and the Politics of Discourse in Cold War America. 2nd ed. Cambridge, MA: MIT Press.

5. Seaver, N. (2018). Algorithms as culture: Some tactics for the ethnography of algorithmic systems. Big Data & Society. [Online]. Available at: http://journals.sagepub.com/doi/abs/10.1177/2053951717738104#articleCitationDownloadContainer (Accessed 2nd September 2018)

6. See, for example: Onohua, M. (2018). Notes on Algorithmic Violence. [Online]. Available at: https://github.com/MimiOnuoha/On-Algorithmic-Violence (Accessed 2nd September 2018); Galtung, J. (1969). Violence, Peace, and Peace Research. Journal of Peace Research 6:3. Pp167-191 ; Crenshaw, K. (2015). On Intersectionality: The Essential Writings of Kimberle Crenshaw. New York: New Press.

7. Crawford, K., and Whittaker, M., (2016). The Social and Economic Implications of Artificial Intelligence Technologies in the Near-Term. AI Now. [Online]. Available at: https://ainowinstitute.org/AI_Now_2016_Report.pdf (Accessed 2nd September 2018).

8. See, for example: Pinch, T.J & Bijker, W.E. (1984). The Social Construction of Facts and Artefacts: or How the Sociology of Science and the Sociology of Technology might Benefit Each Other. Social Studies of Science. 14(3), pp. 399-441; Latour, B (2007). Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford: Oxford University Press; Callon, M. 1984. Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. The Sociological Review. 32, pp. 196-233.

9. Edwards, ibid. p7.

10. Meadows, ibid. p5.

11. Meadows, ibid. p6.

12. Ibid.

13. See, for example: Zylinksa, J (2014). Minimal Ethics for the Anthropocene. London: Open Humanities Press; Stengers, I. (2015). In Catastrophic Times: Resisting the Coming Barbarism. London: Open University Press; Knox, H. (2018). What Is Going on with the Weather? Reflections on Gaps Between Data and Experience. EPIC. [Online]. Available at: https://www.epicpeople.org/data-and-experience/ (Accessed 2nd September 2018).

14. Meadows, ibid. A Note from the Author.

15. Mattern, S (2017). Code and Clay, Data and Dirt: Five Thousand Years of Urban Media. Minneapolis: University of Minnesota Press.