CHARLOTTE PARALLEL AND TONY MOORE

XY Domain: An Interactive Audio-Visual Map

CHARLOTTE PARALLEL

After a series of introductory emails, Tony Moore and I met at my final MFA exhibition, *Ecologies of Transduction,* in March 2016, at the Anteroom in Port Chalmers.

The research interests behind my exhibition—transduction and sonic cartography—started a discussion about our mutual interests of sonic cartography. After a three-month email thread, and quite a few cups of coffee later, we arrived at *XY Domain* — an interactive sound map (Fig. 1) that visually and sonically traces electrical networks. *XY Domain* references axis, data, code and area, a formal structure used to plot coordinates within a designated area. In this case the area is the block surrounding the H.D. Skinner Annex of the Otago Museum in Dunedin, New Zealand.

XY DOMAIN AND OUR INDIVIDUAL PROCESSES

Walking around the block surrounding the Skinner Annex, I mapped the objects and signifiers of electrical networks and systems that are part of our day-to-day visual and operational landscape, such as power poles, UHF aerials, ATM machines, street lights, electric doors and surveillance cameras. These objects, or signals, in determined forms, transmit and receive electrical and electromagnetic signals to perform and power utility, financial and localized surveillance networks. Tony then designed each symbol and created a digitized map that became the base of the work.

Our everyday use of electrical energy implies a relationship, a field of engagement between one thing and another. By selecting and mapping objects like street lights and ATM machines—that convert one class of energy to another (transduction)—we are initiating a kind of energetic forensics that observes and considers "complex systems consisting of electronic, electrical, mechanical and physical components."[1] Dodge and Kitchin also refer to the transfer of information between these objects as "coded processes where the flow of digital data flows between digital infrastructures."[2] The ATM machine provides a concrete example of how code and transduction work hand in hand in the transfer of data. When I use the ATM machine, a surveillance camera monitors my presence.

The use of the machine is aided by a light at head height and an interactive LED screen. I then

Figure 1. *XY Domain* (Photograph by Pam McKinlay).

use a bankcard and PIN number to access personal information and a relevant bank network. The bank network then uses this transaction to perform updates, send out statements in relation to the procedure at this particular time. By performing these typical steps, I have participated in multiple coded processes that work together in the transfer of information. Each part of this process involves a transducer that connects the individual to a complex system. The transducer does not store the information, rather it suspends the present "or put differently it retains a margin of indeterminacy through which it can keep receiving information without becoming an entirely different entity."[3]

Of interest in my own creative practice is listening or attuning to the objects/black boxes that are the signifiers of utility, financial, social, political and ecological systems. Again it is through transduction that I can listen in to the interfaces that enable the transfer of information.

Attunement is a focused attention to what creates an event, notably energies. Energy is a force, an all binding, obvious but largely invisible process. As a living or powered mechanism, a transducer is the transformative interface that allows the change from one energy state to another. Every sound we experience has been transduced, connecting us as human beings, the "users" of mechanical and electromagnetic energy and all organic matter, to a larger energetic system.

To listen to interfaces, such as the LED information screen on an ATM machine, or the mechanisms of an electrical door, I used my DIY light-to-sound transducer—a solar panel wired to an audio jack which is then plugged into an amplifier. The solar cell can convert a time-varying light signal into a time-varying electrical signal. This small electrical signal can then be fed to an audio signal amplifier and is then converted into sound.

Figure 2. Link on SOUNDCLOUD to a sound file of the kiwibank ATM on the corner of Great King and Albany Streets, photo of the author in the process of collecting signal data in the environment around the Otago Museum. https://soundcloud.com/portc/kiwibank-atm

Wandering about with a solar panel attached to a 2-metre pole, holding an audio recorder, wearing headphones (Fig 2.) and with wires drooping from the pole is not your usual street attire and often verges on a performance of sorts. I had many curious passersby strike up conservations and often drew the attention of security guards!

XY Domain also requires your body in the space to perform and activate the operational forces of a site. I wanted the work to direct attention, on the one hand, to how we exist in a continuum of, and specific concentration within, the electromagnetic field through our capacity as a transducer, and on the other, to where the activation of sound has the potential to relay intersecting and often unseen operations of geo-political, economic, ecological and social infrastructures.

XY Domain is sonically dormant until activated by a visitor to the map. The electronic circuit used to relay the corresponding sounds to symbols is plugged into a power source (Fig. 3) and therefore the circuit is always live but only realised when someone walks on it. The experiential nature of the work directly locates the participant in a techno-body relationship, as electric bodies with a circuit that in turn activates and references the sounds of a wider constant electrical network in the surrounding streets.

Each participant creates the "final work." Some visitors chose to play the map as an instrument, using their whole body to activate buttons and their corresponding sounds at the same time. While others chose to activate the sounds, symbol by symbol. The soundboard is polyphonic allowing for the layering and repetition of sounds over the top of one another. *XY Domain* is akin to an aural circuit that hopefully draws attention to our interaction with an ongoing, invisible and often unheard cross pollination of electrical and electromagnetic signal.

TONY MOORE

Nowadays, we find ourselves inundated by data. These data are increasingly liable to take on the characteristics of Big Data where, by popular definition, the volume, velocity (rate at which the data

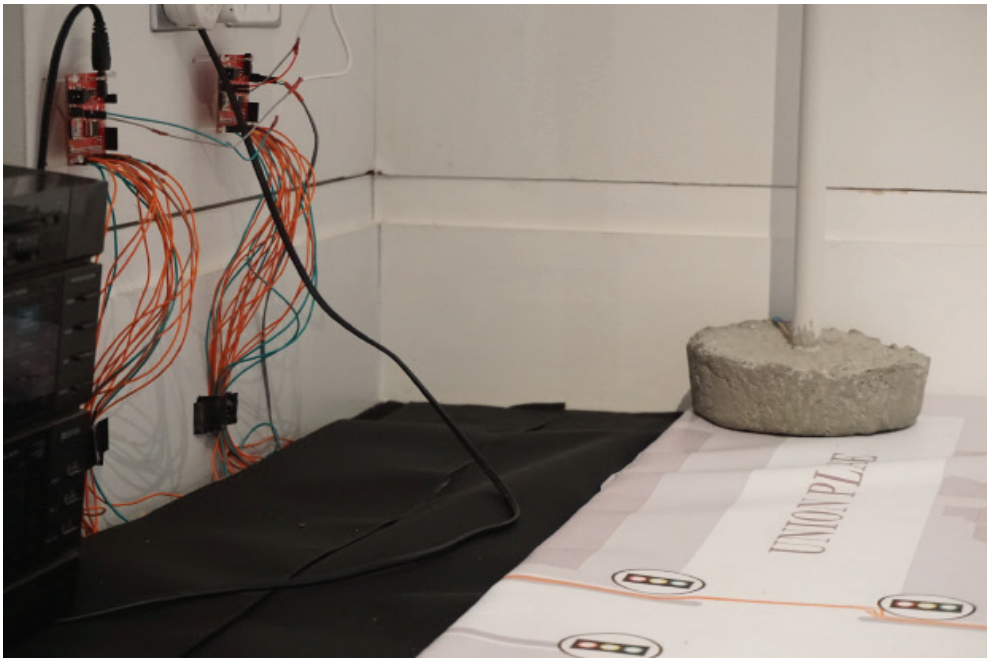

Figure 3. Detail of sound boards in XY Domain. Each wire is attached to a button under the map that plays the corresponding sound when triggered by someone walking on the symbol (Photograph by Pam McKinlay).

is incoming) and variety (many types) of data[4] exceeds our — us and the technology at our disposal — ability to process it in real time, and therefore extract all the meaningful insights from the data. This is no less true of spatial data, which comes from a staggering array of sources (from professionally organised data collection to informal capturing of personally-oriented data with smartphones) and only a small proportion of which we see, usually in a visually transformed way, as part of a map.

I came into this artist-scientist collaboration with Charlotte from a geographic information and mapping background, where one of the current research challenges is how to represent Big Data.[5] It is recognised that potential solutions will require something more than conventional maps, and the arts are one of the supplementary groups of visual and aural media being investigated for this. Encountering Charlotte's evocative sound map installations for the first time at her *Ecologies of Transduction* exhibition, it was immediately apparent that there was considerable overlap in our interests and approaches (not least, as there is a rich background of sound mapping in cartography), with fertile ground for collaboration.

Our initial discussions were around what form the sound map would take. The first idea postulated was that the entire exhibition space would be the boundary of a sound-only map (no visual aspect). Motions sensors would be positioned at the entrances to the gallery, where visitors would trigger sounds at varying frequency (equivalent to volume), rates (velocity), and in unpredictable combinations, that can vary according to the environmental and human dynamics of the room (communicating another cited attribute of Big Data, uncertainty). The sound data first proposed were

easily recognisable sounds from Dunedin city and surroundings, together conveying the attribute of variety. These sounds would be situated around the room so as to create a sound map corresponding to an approximately 50 km x 50 km area centred on Dunedin.

XY Domain ultimately ended up in a different form from these initial thoughts, a 2 m x 2 m hybrid sound and visual map that participants could walk on, triggering multiple sounds through embedded buttons. Therefore, they would still get a sense of being surrounded by data in the way outlined above. The reasons for this change were pragmatic, there being other sound exhibits and the over-sensitivity of motion detection sensors. A second change was the data being communicated. The located transduced electrical and signal data heard in the final exhibit shares the pervasive nature of Big Data and is indeed a part of it.

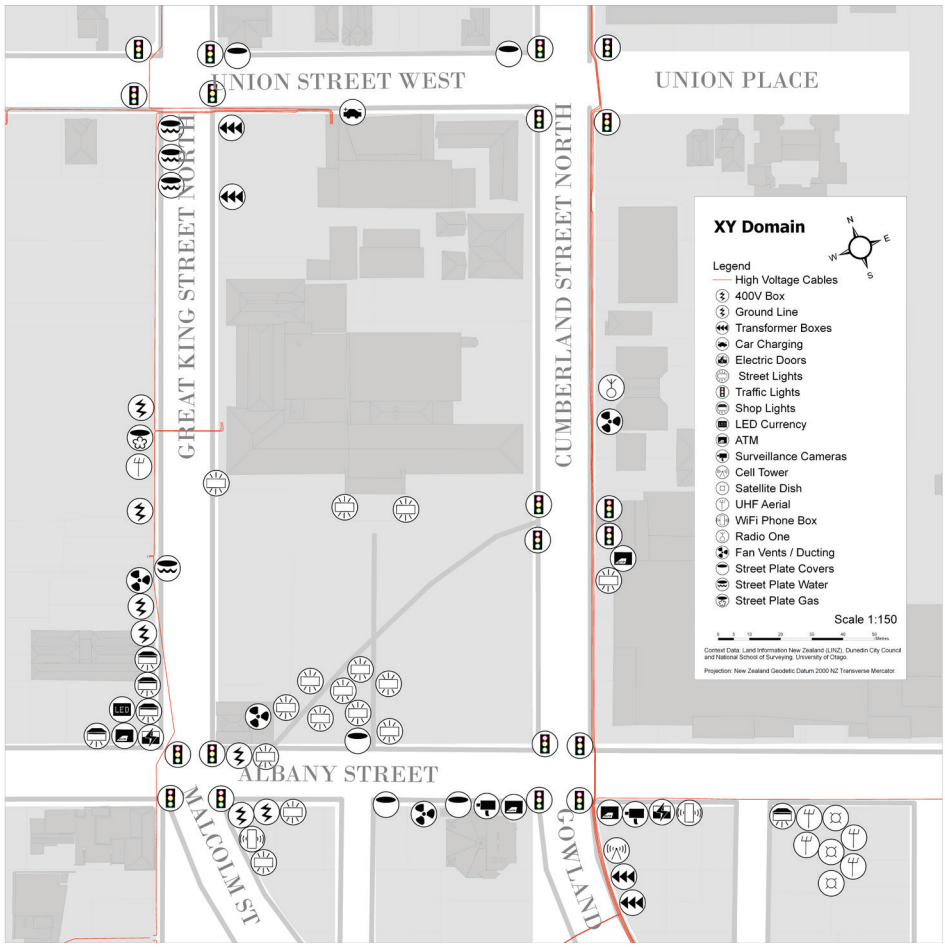

Figure 4. The visual map, part of *XY Domain*.

The visual map of the area one city block around the exhibition space (Fig. 4) is 1:150 scale as exhibited. It is aligned with geographic reality and was printed in PVC. The sound trigger buttons were arranged in location and vertically just above the level of the map. Point symbols were either adapted or designed to represent the sources of electricity in the neighbourhood of the gallery. Examples of these sources are lighting, electricity access, transmission infrastructure, surveillance cameras, ATMs, electric doors, as well as underground cable data provided by Dunedin City Council. Background context data were sourced from Land Information New Zealand (LINZ) (road, path, parcel) and the University of Otago's School of Surveying (buildings). In a visual comment on Big Data, one of these datasets is incomplete and another includes one uncorrected mistake. Spatial data management and cartography tasks were completed using ArcGIS 10.3 Geographical Information System (GIS).

Charlotte Parallel is a practicing artist in the fields of sculpture, sound installation, collaboration and performance. Often choosing to respond to a site in a temporal way. Based in Port Chalmers, she completed her MFA at Dunedin School of Art in 2016.

Associate Professor Antoni Moore is a senior lecturer in Geographical Information Science at the School of Surveying at the University of Otago, and is the director of the BAppSc course in Geographical Information Systems (GIS).

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2. Dodge and Kitchin:2005
3. Adrian Mackenzie, "Radical Contingency and the Materializations of Technology," in *Transductions: Bodies and Machines at Speed* (New York: Continuum, 2002) nn. 3, 26.
4. Doug Laney, "3D Data Management: Controlling Data Volume, Velocity, and Variety," *Application Delivery Strategies: File 949* (META Group: 6 February 2001).
5. A.C. Robinson, U. Demsar, A.B. Moore, A. Buckley, B. Jiang, K. Field, M-J. Kraak, S. Camboim and C R. Sluter, 2016, submitted to "Big Data and Cartography: Research Challenges and Opportunities for Making Maps that Matter," *International Journal of Cartography*.