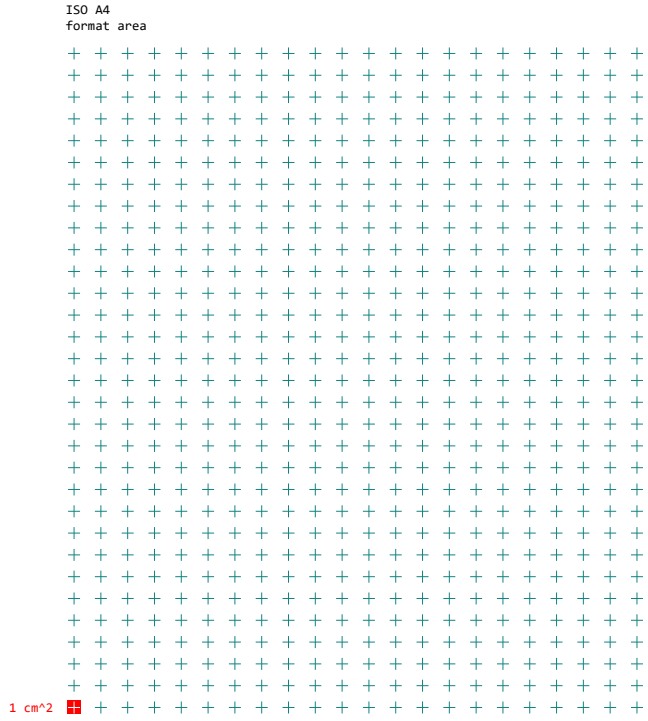
operation manual for the Panama Canal

AR3A010



congested infrastructure

david marcinek
henryk gujda
caleb mehari
szymon kaniewski

transient liquidities along the new silk road III
borders & territories graduation studio 2023/24

table of contents

3.....Foreword
4.....Theoretical assemblage
6.....Representational techniques
9.....Final reflections

Foreword

This research, alongside Borders & Migration and Ecology & Contamination, is part of the Borders & Territories' 2023/2024 Transient Liquidities along the New Silk Road III Graduation Studio cartographic investigation around the Panama Canal area.

Intention to map areas between the 'far East' and other parts of the world emerging spatial complexities, with a special focus on the fundamental changes that are currently occurring regarding radical spatial differentiation, biodiversity, atmospheric and soil conditions, increased technological spatial control and economic asymmetries are addressed.

Looking at existing border conditions within the larger territorial scale(s). The studio focuses on urban and territorial sites where 'other' spatial conditions 'teeming with suggestive meanings and unexpected potential' in a context of discourse that to a large degree omits alternative perspectives. By mapping the larger territory first, and specific localities within that territory later lead to finding obscure aspects of spatial conditions and describing dimensions simultaneously with the obvious.

By taking perspectives on three separate issues, namely, Borders & Migration; Contaminated Ecologies; and Congested Infrastructures.

With perspective on this mapping the purpose of this exercise is to link, understand and question the complexities of the interaction between the concepts of congestion and infrastructure.

Theoretical assemblage

Necessity of computer analogy for the Panama Canal

We were trying to find a new perspective on the Panama Canal regarding infrastructure and congestion that would provide an accurate overview of its workings yet at the same time address a new perspective on how these processes relate. While the map was being produced, we kept on attempting to define exactly what would allow for this new perspective to emerge. For our research, then, one of the main sources that has fueled our thought was a short, yet for our perspective very productive, essay by Deleuze called Postscript on societies of control published in 1990. Using the theoretical framework provided in this essay, we note that in the age of disciplinary societies the Panama canal finds its origin, yet during its lifetime the societies have predominantly changed from this to the societies of control.

Previously, the United States created the canal in the wish to create ever expanding larger enclosures of both maritime trade and military presence and a disciplinary ‘colony’ called the Panama canal zone, an area in Panama that surrounded the canal which was controlled completely by the US. Yet with the transfer by the US of the complete canal rights to the Panamanian state and the dollarisation of the Panamanian economy, the relations of power have now shifted to a control that is much less centralized and nebulous. Additionally, with multiple options emerging to cross the Americas by train or another canal in Nicaragua, the global position of the Panama Canal is slowly changing: no longer is it the sole, mythical wonder of human engineering that provides the previously thought impossible, yet ‘globally necessary’ link between two of the largest oceans on earth. Instead, it is just becoming a link or option in a global marketplace of infrastructure, bringing with it its own unique benefits and drawbacks.

Therefore the necessity to map the Panama canal as a computer system, a machine that according to Deleuze is one that easily matches with these new societies of control, becomes apparent, since this can in turn expose the contemporary problems that are present in the Panama canal.

The introduction of specialized definitions for the main terms enabled the development of a scope of the investigation:

Infrastructure
All systems and processes that sustain and facilitate the movement of cargo from Pacific to Atlantic port areas and vice versa.

Congestion
Space and time when infrastructure gets too blocked or crowded to sustain the process.

This also matches really well with the supposed dangers of the different machines that are highly compatible with the societies of discipline and the societies of control:

„The recent disciplinary societies equipped themselves with machines involving energy, with the passive danger of entropy and the active danger of sabotage; the societies of control operate with machines of a third type, computers, whose passive danger is jamming and whose active one is piracy and the introduction of viruses.” (Deleuze, 1990)

We hypothesize, therefore, that these two passive dangers of both society types, those of entropy and jamming, are at the core of the Panama canal, and that precisely the intersection between these problems is fundamental to understand the Canal’s contemporary existence.

Systems Theory and the Panama Canal

To make the intersection between these problems apparent, inspiration was taken from a scientific field that emerged in between the disciplinary and control societies, namely ‘General System Theory’. A well defined definition for this theory can be found in Ludwig von Bertalanffy’s study developed in 1969, which is the study of the abstract organization of systems, independent of their types and substance and the study of interrelations between respective parts within those systems.

To render the totality and complexity of the material flow in relation to the dimension of locks, the water level in Gatún Lake, the capacity of the port terminals, and the dynamics of the global economy the category of Open System must be introduced. Ludwig von Bertalanffy defines it, as contrary to the closed system, by the quality of “maintaining itself in a continuous inflow and outflow” (Von Bertalanffy 1969).

In order to grasp the complexity of the issue, the Canal was perceived and mapped as a system of interrelations and entanglements, a schema of quantities, connections, and flows. Cause-effect chains, which are the backbone of the functioning of the infrastructure, above all the dependence of the frequency and price of crossings on rainfall and water management and the frequency of alternative forms of transport on the smoothness of port operations, capacities, and global trade power relations, are in the state of constant change and search of equilibrium. Von Bertalanffy (1969) states that “In any closed system the final state is unequivocally determined by the initial conditions”, while in the case of the Open System, the final (or future) state is a matter of constant negotiation between the inflows and outflows. The inputs of the open system of Canal’s infrastructure can therefore be seen as a reflection of global market trends, geopolitics, and ecology.

The map in the context of the General System Theory, becomes not only the representation of the system but also serves a role in the feedback scheme by providing an informed critical reflection, and might become a tool to test the current conditions and speculate about the future, as the congestion and exhaustion of the current system exacerbates as a consequence of specific processes in the system that can be identified by mapping these interrelations.

Representational techniques

Representation and the computer chip

Graphical representation as the computer chip follows directly from the understanding of the canal, the lake and cargo as elements within a larger system. The inspiration for this representation became more apparent because of the transition of these ‘components’ in the current age towards functional reliance on digital technology to the point that one cannot do without. Additionally, „The growing complexity of our machines has led to the miniaturization of parts; electronics has already altered our conception of how things need to be shaped in order to work, and of how they must be related to each other.” (Drexler, 1958) This highlights the transition from the material to the functional. Finally, the reliance on new machine art is instrumental in understanding that it is „visually incomprehensible unless one knows about and believes in the existence of invisible forces. [...] Geometric machine art suggests one change that technology is likely to make on many of our common artifacts: the dematerialization of solid forms into clusters of linear relationships.” (Drexler, 1958) The linear relationships within computer chip boards are a result of shortening pathways between elements, embodying the concept of mass production in which the canal is the central node facilitating world trade that is currently reliant on it. That is why drawing techniques associated traditionally with a representation of technical systems were used to codify the geography of the entire canal.

Reducing components to abstractions

Each element of the canal system is simplified along its physical shapes that make for a representation of specific elements purely as nodes with a simple function within a larger system. This brought about a question of representation of the territory and an even more serious question of the distinction between infrastructure and landscape. Over the process these have been equated leading to an abstraction alluding to the understanding both, the geographical and the technical components of the infrastructural landscape as equal actors that allow immediate comparison. The respective symbols and hatches correspond to the systemic decomposition of the larger context highlighting a blur between the represented and representing.

The aesthetic of electronic circuits is an emanation of the systemic, constructivist and controlled. Simplification, systematization, and quantification of processes are crucial in the rhetoric of reconceptualization into an abstraction through data, interrelations and reducibility of the separate elements to their quantifiable attributes. This was a central notion of achieving a coherent visual aesthetic while questioning their architectural complexity.

Fields and rules of quantification

Understanding both the geographical and technical components of the infrastructural landscape as equal actors within a system allows for a unified method of measure. A territorial quantification is proposed, whereby unapproachable large numbers are broken down into smaller, more digestible portions and layed out as a field of representative units. This way the geography of the Canal is quantifiable in the same way containers are. Five different units are introduced, each representing a category of quantification: Volume, Area, Water level, Money, Time, Unit of quantity. The volume of water lost, the storage area of the ports, the Gatún Lake water level, the toll prices for vessel crossings, the waiting time on each side of the canal and the amount of Containers that are moved are all laid out as quantified fields, primarily relating to each other by the size of each field. The fields of units are scaled varyingly, considering both the approachability of the representing units and the size of such a field on the map. The map differentiates between quantifications that relate to territory and those that are detached from it. The territorially detached quantifications are highlighted as a separate layer, functioning as a legend to the map. Indicating the values of the representing units and providing quantifications on the soft infrastructure of the Panama Canal. The legend layer helps put the quantifications into relation.

Final reflections

Diversification of transport systems across the isthmus

The main discovery that emerged from our research is that the Panama Canal actually does not solely function as a canal. By framing the canal as a ‘transport system’ across the isthmus, we were able to identify separate auxiliary means of transport, such as rail and road, that are becoming increasingly more important as the average water level in the canal is lowering significantly. Because of global warming and lessening rainfall, the problem of entropy (emerging as a consequence of the machines of the disciplinary society)(Deleuze 1990) appears to have to be negotiated with the contemporary problem of ‘jamming’ by pressures of an increasingly competitive global market of infrastructure, which in turn, paradoxically, results in a slow expansion of non-canal means of transport.

High (ecological) dynamism of the system

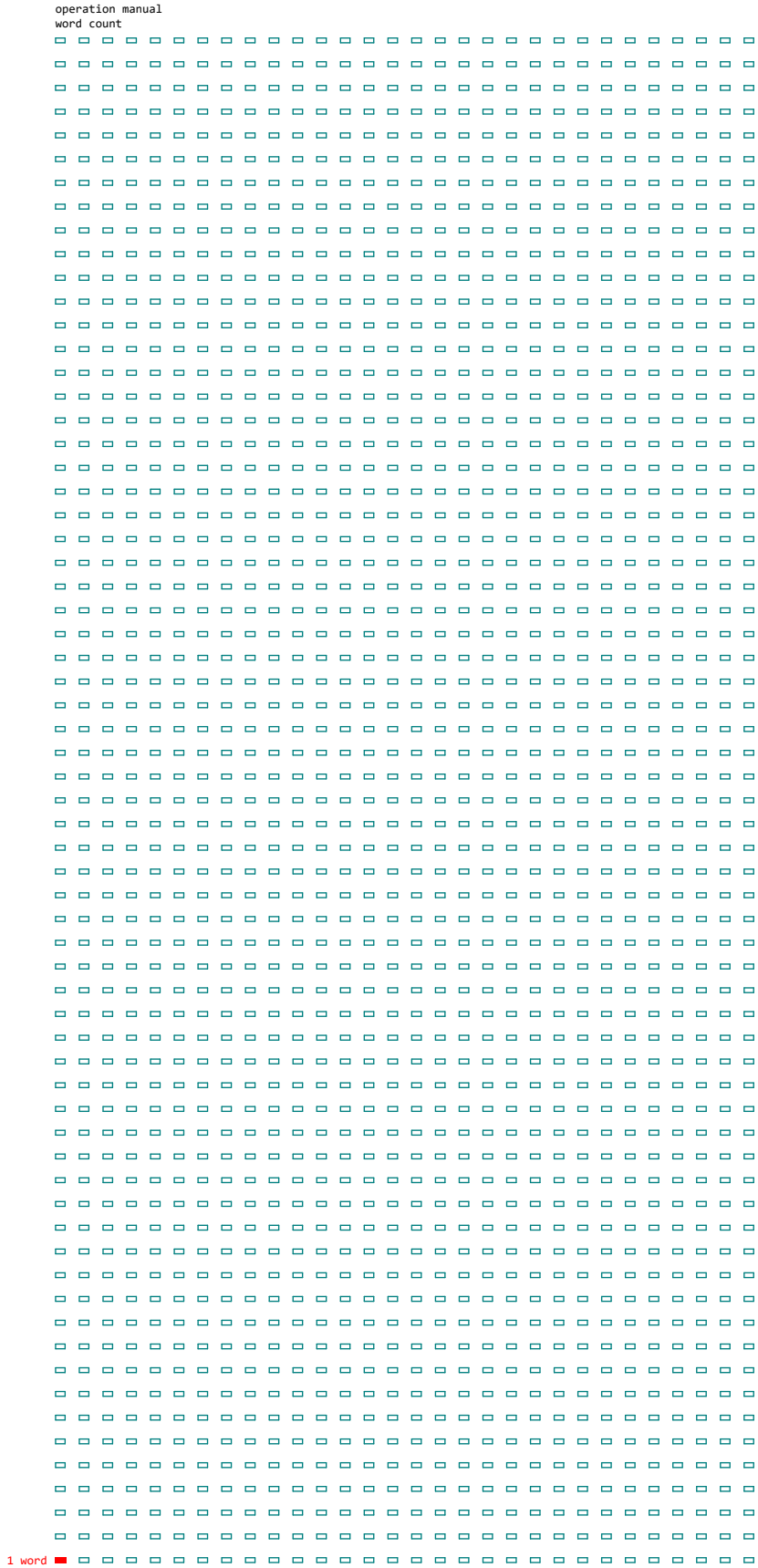
Another discovery that can be read in the map when looking more closely at its quantifications, is the fact that almost the entire volume of water of Gatùn lake gets lost to the ocean through the locks over the span of less than a year. This illustrates the importance of rainfall to the functioning of the Panama Canal and also the extreme climate that is specific to Panama’s ecosystem.

sources

Deleuze, G. 1992. ‘Postscript on the Societies of Control’, October 59 (Winter): 3–7. Original publication: Deleuze, G. 1990. ‘Post-scriptum sur les sociétés de contrôle’, L ‘autre journal: 1, mai.

Drexler, R., as quoted in: McCarty, C., & York, M. O. M. A. (1990). Information art: Diagramming Microchips.

Von Bertalanffy, L. (1969). General systems theory. New York: George Braziller.


operation manual
word count
1 word