

Reflection

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Studio

Name / Theme Transitional Territories / North Sea: Landscapes of Coexistence
Main mentor Taneha K. Bacchin Design
Second mentor Sjap Holst Building Technology
Third mentor Kaveh Dabiri Research

Graduation Project

Name Archive Fever. Introducing Data Storage in the city of Hamburg
Location Hamburg, Germany

01. The relationship between research and design.

Working with intangible is in particular challenging, especially if one has to translate it into an actual physical space. Throughout my process, I tried to understand digital data and the phenomenon of storing endless memories in bits and bytes. I realized how little one understands, besides being a part of the Network Society about the infrastructure that enables the internet connection and data flows.

Basing the research on the territorial scale of the North Sea region, which houses over 60% of all data centres in Europe, I tried to examine the impact of data on the remote landscapes. From there, I decided to focus on the source of the data escalation – cities. In the typological part of my research, a data storage type emerges as an opaque container - defined by the size of a stored unit – a server rack. Even though being highly technological, data centre continues the typology of storage architecture. All content defined buildings, technical as they are, allow for almost no human presence, but do potentially manage through their sheer size to organize and control the context they inhabit, the territory. One cannot underestimate their territorial and urban impact. It was a truly challenging task to translate extensive research on digital data and storage practice into the urban and architectural scale. However, starting with such a broad overview and a variety of references enabled me to build a strong foundation for taking conscious decisions on the design stage of the project. Therefore, the Project gradually developed through exploration and application of theory into the applied design solutions. Finally, the project was informed by the parallel, back and forth design and testing.

Founding on the feedback given by my mentors I was able to push my limits and challenge my initial conclusions. The unique experience to develop a design preceded with extensive theoretical research was a completely new challenge to me and I appreciate the patience and constructive feedback I received along the way. I believe that it helped me to build a strong narrative and enrich project on many levels.

From my own work, I have learned the patience to allow the research to bring the conclusions rather than jumping into them in the early stages. Moreover, that unobvious typology study might bring an interesting and innovative approach to design like the storage typologies to data centres.

02. The relationship between your graduation (project) topic, the studio topic, your master track and your master program.

Interdisciplinary approach of the Transitional Territories studio establishes cross-field research. Within its framework, it is integrating, besides architecture and urbanism, also landscape design and water management. Therefore, the studio is coherent with the reflection of the profession at the faculty of Architecture and the Built Environment. As far as I am concerned, in professional life, the success and innovation of the design lie in a continual and parallel interdisciplinary coordination during the whole design process. Aforementioned constitutes a base of the studio approach.

Through my project, I am studying the way in which data could be reintroduced and integrated within a dynamically growing city, this topic inscribes in the studio's research framework. Starting from the impact of data flows and growing storage needs on a territorial scale of the North Sea region that lies in the studio interests, followed with the specified research in urban and architectural scale.

There is no doubt that information is a base and embodiment of the highest value in the Network Society. What is more, people keep on producing more data each year. In reality of a constantly increasing capacity of digital storage, we keep on gathering more. Created limitless 'cloud archive' has an overwhelming physical presence that takes over hectare after hectare of land. Data storage buildings manage through their sheer size to organize and control the territory they inhabit. One

cannot underestimate their urban impact that will have a great impact on the processes of territorialisation in the North Sea region.

I consider architecture as relevant to planning, urban and landscape design as to other engineering fields. I hope as an architecture student I will be able to contribute to improving our cities by designing them with liveability, resilience and sustainability in mind. Especially by integrating the variety of disciplines within the approach to my research. Consequent to the studio, my project attempts to keep a cross-field approach and inform the design with knowledge from a variety of disciplines. Therefore, abovementioned the project has a non-hierarchical and dynamic structure.

03. *Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.*

- *Mapping*

- *Theoretical research*

- *Typological research*

- *A research on how data centre may be designed in the urban context*

The trans-scalar approach of the studio integrates investigation from the level of the territory of the North Sea region up to the ground and body scale. Coming from the wider context to one's project-specific research subject. This approach proposes a variety of research methods and techniques. The foundation lies in the collective phase that combines theory and visual representation, materializing in the act of mapping, which is a conscious act of heuristic research. This phase allows for the study of the North Sea from various perspectives (geological, ecological, political, and social) and the translation of scientific data into maps documenting past and current state, as well as the future projections. The wide spectrum of topics as well as the formulation of the future scenarios broadened a deeper understanding of the studied trends and their impact on the territory. The aim to create collectively an atlas became a tool for research likewise representation of the assembled conclusions.

Moving to the scale of the individual project the focus shifts from the territorial scale into the site-specific analysis. The collected data about Hamburg is informed by literature and extended by an on-site inquiry. At this stage, different means and methods come into research on the relevant investigation scale. These include mapping, drawing and collage, text and photography.

Considering the vast amount of information on the subject of interest, the research may be difficult to manage. Therefore, the combination of multiple techniques allows for dynamic change of the method depending on the current needs and state of the research. Such strategy enables gathering of both raw data and the ephemeral attributes, temporal dynamics and atmospheres, and is, therefore, a mean of value for phenomenological inquiry. Along with the first research steps, a literary inquiry about data, storage and archiving, content defined architecture was undertaken. The initiated review of the literature broadened the knowledge, historical development and theory of the subject. What is more, it forms the foundation for heuristic research by design approach. Within the broader context of global trends, I gave particular attention to the *Archive Fever* defined by J. Derrida, as well as a growing amount of digital data. Additionally, a complementary research method is provided by case-study analysis. Multiple examples illustrated the various storage typologies, from a museum to warehouses. By reinterpreting the storage spaces, I was able to get a better grip of the architectural type and the common physical aspects of materialization, their design components, function and finally their stories. This outlook provides an insight into what the architectural intervention of the project could be. Research by Design – an inquiry in which design is an essential part of the research process – is applied as a common strategy. It relies on the continuous reflection and reframing to be

made throughout the design process, enduringly testing and adapting to new potential solutions. Therefore, according to the needs, the research is extended along with the design.

04. *Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.*

My graduation work draws its relevance from two aspects. On the one hand, it has the ambition to integrate different fields and approaches, including architecture, planning, urbanism, landscape architecture and engineering. Taking into account different actors and stakeholders in purpose to build a comprehensive picture of the social aspects of defined archive fever and constantly growing storage. Growing repositories generate higher costs each year which indicates a need to place storage on display, face and acknowledge what and in which amount we actually produce and store.

Secondly, my project has its relevance due to current trends in technology, among others, the Internet of Things and growing amount of latency dependent applications, that generate a need to introduce data back into the city. Even though data is already fully integrated and present in our lives, we rarely acknowledge it. What is more, due to lack of understanding we are often excluded from the discussion on the degree of its presence in our lives. While data and communications gain a ubiquitous presence in Network Society the conducted research gains its relevance as well.

Lastly, considering that abovementioned technologies are mainly developed by engineers and technicians there is a growing need to review their architectural and urban impact on the cityscape, keeping in mind the importance of its social and political importance. My research fits into contemporary discourse by addressing these issues. Asking questions if we should create a separated world of service for our infrastructure, and therefore separate culture and technology to the extent that we do with unpleasing technologies. Quoting Rem Koolhaas *“At a moment when our collective history is digital, the data centre is becoming one of our most significant cultural typologies.”* In this context should it become an anonymous part of the outskirts rather than a part of our urban landscape?

The design results are specific to the data technology and Hamburg site, however the project is, to some extent, transferable across typology and place. Especially harbour cities could apply similar approach to design of data centres, in the context of accessibility to cooling sea water and tidal energy.

05. *Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.*

The project combines the abovementioned scales, starting from the territorial network up to the scale of the site in Speicherstadt district and the human visiting the machine. A proposal to place a Data Centre in the city besides being a statement – that brings a public attention to the impact data has on the physical space, the project also aims to transform the emerging issue into a benefit for the nearest neighbourhood and citizens. The proposition of a new typology explores the hidden potential of infrastructure. The building is designed as a vertical street, an extension of the public space of the plaza, that penetrates and explores the machine. It is introducing one of the most significant elements of our infrastructure physically into a culture, giving the digital data a physical weight. The project is a gesture that brings data, technology, people and context together, emphasizing interconnections and interdependence of all. Moreover, the waste heat is reused for the district heating (potentially saving even up to 90% of used electricity by servers) and the tidal waters of Elbe are producing energy. Lastly, the data bank is challenging the surveillance and idea of security of our data, drawing attention to the fact that physical security is the minor problem for data centres competing with cybersecurity.

As far as I am concerned, the proposed design solution is interesting to be applied in harbour cities – due to proposed technological solutions. I believe that my project is a good base for opening a discussion on the current role of a data centre and it's future potential in the urban context.

06. Describe how the final part of the graduation period will be filled in.

During the P4 presentation, the main focus is drawn to the final manifestation of the project through architectural design, exploring full design development through all scales. The discussion offers a moment of reflection on further progress and clarification that will be included in the finalization of the project until P5 presentation. Detailing, visualization and curatorship of representation in a way to emphasize the main narrative of the project will be the main elements of attention in the last weeks of the design.