Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Personal information	
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Studio		
Name / Theme	Complex Projects / Bodies & Building Berlin	
Main mentor	Benjamin Groothuijse	Architecture and the Built Environment, Berlage
Second mentor	Jan Van de Voort	Architecture and the Built Environment, Architectural Technology
Third mentor	Maruli Heijman	Architecture and the Built Environment
Argumentation of choice of the studio	Building type - airport Airports have long been my personal fascination as they serve as gates into cities and countries, occupied by users with different regions and purposes. With complicated and intricate circulations and flows behind, they always make me wonder how everything is designed. With my MSc2 Architectural History Thesis focused on the relations between airports, cities and infrastructure, this studio would be a chance for myself to even go further than analysis in a larger context, but to zoom in to building scale and step into the process of designing. Programmatic & logistical complexity As its name suggests, Complex Studios focuses on designing and making sense of programmatically and logistically complex building types. Rather than complicating them, it is the ambition for architects to design with simple, understandable logics. I envisioned myself being able to grasp such complex organisations of public buildings – not only airports, but also other building types that would be studied by other colleagues.	

Graduation project	
Title of the graduation project	Urban Takeoff – water airport of health and play
Goal	
Location:	Rummelsburger Bucht, Berlin, Germany
The posed problem,	Airport and Berlin (city) Airports and cities have been growing closer together. This can be attributed to the advancement of aviation technology, economic and population growth since the post war era. Despite the efforts of trying to separate airports from cities, rapid expansions of both are bringing them closer, posing problems such as high carbon emissions, noise pollutions and inaccessible urban structure in cities. Together with the advancement of aviation technology, especially hydrogen-powered aircrafts, flights in the future would be made quieter and carbon neutral. Considering the possibility to bring back seaplanes, there would not be a need to build kilometre-long asphalt runways but to utilise natural waterbodies. It is high time for architects and planners to rethink the possibility of integrating airports into cities instead of creating more barriers in between. Airport as building (infrastructure) "(the project) disrupts the sense of monumentality that typifies terminals and contributes to their isolation from daily life." – FMA on Yokohama Terminal Both as gigantic city infrastructures, airports and cruise terminals are often regarded as a self-contained bubble isolated from society. The project investigates into breaking the borders between airport infrastructure and society and opening up such massive buildings for the public. Meanwhile, it also looks into how hydrogen facilities could be spatially integrated into airport infrastructure.

	Airport for bodies (humans) The efficiency of flows and logistics has long been the priority when it comes to airport design. As the project explores the feasibility of partly opening up the water airport for public, different kinds of users are brought into the picture and a seemingly contradicting consideration would have to be examined – playfulness and human centred design. It is believed that a balance between efficiency and users' well-being shall be achieved in airport design. The project strives to cater for three types of users: rural patients, urban escapers and the public. Through the introduction of urban-rural flights and playscapes in the building, physical and mental health of users would be improved.
research questions and	Given the current aviation technological advancement, closer relationships between infrastructure and urban developments, and increasing emphasis on well-being, this study looks into the research question of "**How to design an airport in the urban context which dedicates its infrastructure for a healthier city?**". In order to answer the research question, qualities and key focuses of a good inner city airport design shall be first identified through the first two sub-questions of: "How to design an efficient inner city airport?" and "How to design a health-oriented inner city airport?". To achieve the goal of designing a decent inner city airport, a balance between the two seemingly contradicting aspects shall be achieved. To conclude this study, the third and final sub-question of "How to balance operational efficiency and users' well-being?" will be answered so as to address the change in future airport design strategies.
design assignment in which these result.	The research questions would be investigated through the design of an inner city hydrogen-powered seaplane port located in Rummelsburger Bucht, near the centre of Berlin. By using seaplanes, the airport would be a small-scaled airport with the approximate size of 48,000 square metres next to the Spree and no runways on ground

	would be necessary. With innovations of the hydrogen fuel, airports could be more environmentally friendly, sustainable and thus could be located at the heart of Berlin, benefiting medical passengers from rural areas and domestic travellers escaping the city for a break. However, feasibility and efficiency would not be the only considerations of the airport. Being adjacent to residential districts, the airport would also have to serve residents and help maintain their health and well-being. It is proposed that through play, mental health of airport users could be protected or improved. Thus, a significant portion of floor area would be reserved for developing play and leisure areas for all types of potential users.

Process

Method description

Research: Program

The program requirements of the project would be developed through a series of different methods: literature reviews, site visits, case studies, online research and benchmarking.

Literature review

To start with, literature review of relevant books would be done throughout the entire research and design stages, such *as Airport Engineering: Planning, Design, and Development of 21st Century Airports*, *Building for Air Travel*, and *The Airport Passenger Terminal*.

Site visits

Site visits would also be done in Berlin Brandenburg Airport and London City Airport. Brandenburg would be essential for understanding airport requirements and operations. Meanwhile, London City Airport would be inspiring and a great opportunity to grasp the relationship between the airport and the city of London.

Case studies

Case studies would then be conducted with program bars indicating functional distributions of relevant projects, to provide a boarder view of what programs could be integrated into the first seaplane port in Berlin. It would also be beneficial to compare their differences and select what programs and area distributions would be

most suitable. Online research would be essential for comprehending floor plans, sections and spatial relationships of multiple programs.

Benchmarking

Lastly, benchmarking would be an important final step for synthesising the data collected. By comparing the program bars, the minimum area required for different programs could be determined. After selecting the best appropriate reference cases for the project, a new program bar could be developed by finding out the average numbers and adjusting them.

Research: Client

To determine the possible clients for the seaplane project in Berlin, it is assumed that online research, together with literature review and case studies would be the main methods of research.

Background research

Background research would have to be done as the first step to understand capabilities of the aircraft model. Online materials would then be needed for acquiring specifications of the aircraft. Then, current challenges faced by the city, or even the country, depending on the range of aircraft, could be analysed to find out opportunities of the aircraft and the project.

Literature review

After that, literature review on, for example, *Regional differences in health care of patients with inflammatory bowel disease in Germany*, would be done so that more numbers and figures about Berlin could be obtained. This could help improve the reliability of information and help developing a convincing narrative.

Case studies

Precedents of similar airport organisations would be studied in order to shortlist the possible clients. Once the clients are selected, deeper research into their structure, motivations, and reputations would be researched online.

Research: Site

The development of site selection criteria is divided into two parts: individual criteria and health-oriented group criteria. Both parts of the research would require larger-scale quantitative and smaller-scale qualitative analysis. Site visits, online research and mapping would be helpful for the different types of research.

Site visits

To start with, site visit to Berlin would be an essential part. As a group with "health"-driven strategies to be developed, all group members would individually make video record of potential positive and negative "health stimuli". This would contribute to our group research looking into what triggers Berliners the most and what would be the desired urban spaces for them. For developing individual site criteria, pre-selected potential sites would be visited. Photo and video records would be done individually. Based on personal on-site experience, multiple sites could be better qualitatively understood in terms of land use, atmosphere and accessibility.

Research & mapping

While not being able to visit Berlin, online materials found on *Environmental Atlas Berlin*, would become important sources. Environmental data of Berlin would be a major part of the quantitative research, for example: traffic infrastructure, noise pollution and air pollution, which are all stimuli highly related to the topic of health. With the aid of geographic information system (GIS) software to integrate different sets of maps, site requirements and urban strategies of the group could be drawn.

Design: Concept

The first stage of design would be generating a concept for the building form, as a continuation of the previous research stage about site. In relation to the site concepts of the health group, individual visions on the project, massing strategies would be further developed. Structural expressions would also be considered in the meantime as it would be an important part for a water airport and its relation to water.

Design: Design development

Later on, the initial design concepts would be further developed into a more detailed design, finalising the building form, spatial organisations and, especially for an airport, the flow of users and fuels. At this stage, elaborate floor plans and sections would be drawn.

Design: Material

Once the layout has been mostly decided, materials used in the building would be chosen. The choice of materials would be based on design concepts, expression of the building type as well as sustainability reasons. Case studies and thorough research would be done to study how materials are used in precedents and how they change the meaning of an airport.

Literature and general practical references

Architectural Precedents

1. London City Airport
2. Sea Airport of Elefsina
3. Brandenburg Airport
4. Banyuwangi Airport
5. Yokohama Terminal
6. Amsterdam Schiphol Airport
7. Vauxhall Pleasure Gardens
8. Expoland, Osaka Expo '70
9. Brighton Palace Pier
10. Singapore Changi Airport

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Reflection

The complexity of a water airport in relation to its surroundings could be understood through the lens of the studio topic "Bodies & Building Berlin". From an architectural perspective, it dives into multiple aspects of designing for hydrogen aircrafts operations, addressing societal problems of unbalanced healthcare provision in Germany and investigating the possibility of partly opening up airports to the public. Not only are these architectural problems, they are relevant also to the urban scale and building sciences behind the functional aspects of airports.

This thesis is developed in respond to the latest aviation technology advancements and evolutions. It also corresponds to urban-airport relations and emphasises human experience in architecture. Therefore, the study aims to bring about discussions on two main topics: industrial applicability and design ethics.

Industrial applicability

With a pressing need for the industry to evolve and especially stop fuelling aircrafts with kerosene, the industry is conceptualising "hydrogen hubs at airports" and is at the stage of bringing them to reality. It is possible for findings in this study to be useful references as cross-industries stakeholders are realising hydrogen infrastructures at airports.

Design ethics

Airports have long been regarded as a piece of urban infrastructure for efficient processes: check-in, security check, baggage handling, streamline operations and minimising costs. However, as architects, user experiences and public well-being shall not be neglected while designing for efficiency. This graduation topic explores one of the ways of providing positive impacts on users' health: play for mental well-being.