

Study Plan

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Studio	
Theme	Hyperbody: NS&IA
Teachers	Nimish Bilorja, Henriette Bier
Argumentation of choice of the studio	The main reason for the choice of the studio is the interest into the field of Non-Standard and Interactive architecture. In particular the desire of research and develop bottom up strategies for urban and architectural design solutions.
Title	
Title of the graduation project	Networked Systems: A food hub for Paris
Product	
Problem Statement	
<p>The proposed problem, research questions and design assignment. This should be formulated in such a way that the project can answer these research questions. The definition of the problem has to be significant to a clearly defined area of research and design.</p> <p>The project aims to deal with the problem of food production and transportation within big metropolitan areas. The main goal of the project is to develop a new model of urban agriculture capable of working both at a global and local scale. The idea is to integrate a model for the intensive production of food, such as the vertical farm, with a series of functions and devices that work at the local scale in a way in which it would be possible to involve the population into the project. In order to integrate the project proposal with the existing dynamic metropolitan system it is necessary to develop a strategy capable of adapting and reacting to the continuous changes. The strategy aims to investigate some concepts directly derived from the field of NS&IA such as self-organization processes based on the swarm behaviour logic.</p> <p>Defined the problems, the main research questions are:</p> <ul style="list-style-type: none"> - What could be a possible solution for the integration of intensive food production system within the urban context of big metropolitan areas? - Which is a possible strategy that allows deriving a functional spatial organization capable of responding to the dynamic changes of the urban environment? - Which is the most appropriate way to convert this functional spatial organization into an architectural form that is capable to establish a meaningful relationship with its urban tissue? <p>The design strategy try to deal with the various design scale that the project requires in order to satisfy the local equilibrium of the new intervention within the global environment of the city.</p>	

Goal

This section has to include answers regarding what the intentions of the graduation project are.

The main objectives of the project are:

- Find out strategic and programmatic solutions for appropriate integration of intensive models of food production into the metropolitan areas. These solutions require a certain versatility to be adapted at the same time to various urban scenarios and global guidelines principles.
- Satisfy the strategic and programmatic solutions with an architectural project capable of stimulating and involving the urban context on various aspects such as social, urban and climatic aspects.
- Develop simulations and parametric strategies that define a bottom up process from the form-finding generation to the architectural details. This process has to respond to the global requirements of the project's framework and also the various issues of the architectural scale.

Process

Method description

Description of the methods and techniques of research and design, which are going to be utilised.

At the beginning of the process various research on food consumption and production and on different models of urban agriculture were conducted to be able to define the main issues and select the project's site.

Afterwards various analysis of the urban surrounding of the project's site were conducted in order to find out a set of external parameters of various nature (social, programmatic, climatic) that could influence the project. Along with these factors derived from the surrounding other issues connected with the programs chosen were considered in order to develop a simulation for the optimal allocation of the functions within the site. At first various spatial configurations for the allocation of the functions are generated in Processing through the use of a Multi-Agents System based on the swarm behaviour principles. This system is regulated by the negotiation between inner aggregation logics and external influences. This real time simulation offers the possibility to define various spatial allocation of the functions depending on a selected set of influences that wants to be considered as relevant for the project: the main idea is that this system could be applied to other location with as only different other data for the parameters.

From the simulation's outputs a parametric process was developed in Rhino and Grasshopper to translate the data into an architectural form. At this stage various analysis of spatial organizational and generative system like cellular system were conducted. Alongside to this bottom-up process various considerations on proper architectural issues connected with the project's program were taken into account. The idea is to define the various spatial qualities of every function in order to develop an optimized topology under various aspects like climate, space and structure. The intent to follow this route is to use various software and plugs-in like Ecotect and Karamba.

The last considerations will be focused on the possibility of integrate various aspects of the fabrication within the development of the final morphology of the project in order to make possible and feasible the production of the mass customized elements of the building.

Theoretical and practical references

Theoretical (historical, socio-political, scientific and technical research) and practical knowledge that will be consulted.

In order to satisfy the requirements of the project different field of research were investigated. At the very first stage research and data concerning various models of urban agriculture and their consequent application into urban context were studied, with particular interest towards their social and technical consequences and aspects.

As a second step, in order to develop scripting for the real time simulation, researches on different models of Multi-Agents System were conducted. In specific I have analysed simulations based on the swarm behaviour logics, doing this through the help of various scientific articles, architectural journals, books and website. In parallel I have investigated some projects developed by students and firms.

In future, research on cellular system and self organizing system will be conducted, taking care to their possible application in architecture. In specific the aim is to investigate their spatial quality within the architectural field with a focus on their structural quality and potential.

Along with these theoretical research, the idea is to consult various experts to achieve a basic level of knowledge necessary to develop correctly the project. This knowledge will involve software, climatic and structural experts.

Reflection

Relevance and output

The value of the graduation project within the larger socio-cultural and scientific context. List of output with respect to conceptual and design development as well as materialization and construction documents.

The main output that the project aims to satisfy are:

- The development of a model for the integration of intensive production of food into the metropolitan areas applicable to various local conditions.
- The development of a real-time simulation system adjustable to the design statement of the project.
- The development of an architectural form capable of accommodate the main requirements of the design statement
- The development of an optimized topology in terms of structural and climatic issue capable of considering within the process various aspects connected with the digital fabrication.

Time planning Scheme of the division of the workload of the graduation project in the 42-week timeframe (P1-5). Compulsory in this scheme are the examinations at the middle and end of the semester, if required, the minors you intend taking and possible exams that have to be retaken. The submitted graduation contract might be rejected if the planning is unrealistic.

Weeks:

MSc3

1. Research on various models of urban agriculture and experimental green strategies; site selection: Paris
2. Research on Paris (environmental problematic and urban issues)
3. Data collection for the development of the simulation
4. Workshop on multi-agents simulation techniques
5. Strategy and concept development
6. Strategy and concept refinements
7. Concept strengthening and urban strategy
8. First ideas for the simulation
9. Work on simulation and presentation preparation

6/23/2013

10. MIDTERM PRESENTATION (P1)

11. Reflection on progress and future strategies
12. Final definition of the simulation
13. Reflections on the outputs
14. Form finding process proposal
15. Integrated design strategies reviewed and assessed
16. (Holiday) First experiments on the form finding process
17. (Holiday) First model making phase
18. Model making and presentation preparation
19. FINAL REVIEW (P2)

MSc4

20. Reflection on progress and future strategies
21. (Holiday) Refinements on the building form definition
22. Topology refinements and architectural considerations
23. Topology and skin system proposal
24. Structural considerations and skin system development
25. Architectural refinements
26. Structural and skin system developments
27. Final architectural refinements and reflection on possible architectural details
28. Structural and skin system refinements
29. Reflections on structure and skin details
30. Reflection on possible strategies for development of physical models and prototype
31. Structural and skin detailing and reflection for prototype development
32. Project visualizations and structural and skin detailing and physical model making
33. Presentation preparation and physical model making
34. Presentation preparation / GO/NO-GO ASSESSMENTS (P4)
35. GO/NO-GO ASSESSMENTS (P4)

36. Reflection on progress and future improvements strategies
37. Improvements on various design's aspects and refinements
38. Presentation preparation and physical model making
39. Presentation preparation / PUBLIC FINAL PRESENTATION (P5)
40. PUBLIC FINAL PRESENTATION (P5)

Attention

Part of the graduation (especially in the MSc 4) is the technical implementation of the building design. Therefore a Building Technology teacher will be involved in the tutoring team from the P2 presentation on. This should be taken into account when writing the study plan / personal graduation contract, with respect to the time planning as well as in the relation to the content (e.g. statement, method and /or relevance).