Reflection.

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Hyperbody P4
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Reflection.
“Parametric design refers to parametric definitions such as $1 = x^2/a^2 + y^2/b^2$ to describe a 2D curve. Each time a parameter changes, the model regenerates to reflect the new value. The parametric model is a metadesign that can be easily reconfigured” (Kas Oosterhuis)
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1.0 Introduction

The site of the Provençals Transit Hub is situated in Barcelona’s 22@ district, one of the last parts of the Cerda grid within the city center, being transformed to a more contemporary urban tissue. The Ajuntament de Barcelona determined the 22@ transformations in the PGM (Pla General Metropolità, eng: General Metropolitan Plan) from traditional industry into a knowledge-based economy. The most important goal of the municipality in the plan is a new mobility model with advanced infrastructure, including restructuring of the street typologies, the reorganization of the bus line system, a new tramline and a new metro line. Other important remarks include the introduction of mixed-use zoning and the preservation of industrial heritage within the transformed area. An answer to the necessity of a knowledge economy, covers an urban renovation strategy, allowing 7@ activities (ICT, media and MedTech) to integrate in the new urban tissue. The new mobility plan will increase the actual capacity of the local infrastructure, causing more pollution etc. as well. The manner in which local and global climatic associations are thereby established between the transit hub and its context will be an additional concern in this project.
2.0 Objectives, Research + Methodology

2.1 Project objectives + Framework
The main concept of this project is to create a design responding to the site being transformed. The project primarily deals with the new mobility model. Advanced infrastructure networks and nodes within this system will be the base and footprint for the design of Provençals Transit Hub. The context of the building will provide parameters (i.e. transportation statistics) that influence the design. The different programs including the transit hub are then evaluated according their context and relation within the envelope using a parametric design approach. Beyond the standard functions required for a transit hub, other programs such as a combination between a traditional and a high-tech market are introduced as a connecting device. The market has historically been a prevalent element in Catalan daily life, connecting different people of different social backgrounds. Therefore, the market is designed to support the functions of the transit hub as a 24/7 accessible center of the Provençals area.

Proposing the design for a transit hub covering two blocks of the Cerda grid raises the following research questions:
- What functions are needed to make the transit hub 24/7 used and how should those functions be configured?
- What should the transit hub look like in terms of accessibility, configuration and spatial qualities, considering future changes in transport and quantities of passengers?

Finally the design has to be a cohesion of the 7@ activities, linked optimally by the high-tech market and the new infrastructural network. This will debouche into a cohesion of infrastructure, research and marketing. The optimized infrastructural network that mainly concerns the research, will be a performance driven design by environmental and functional requirements. In the end the design affects local and global climatic relations and are thereby established between the transit hub and its context.
2.1 Research + Methodology

The body becomes a Hyperbody when all building components establish an interactive relationship to each other, to the surrounding environment and to the users inside the body. The building body becomes an instrument for the users to play with, a place to negotiate, a space to perform transactions, the hyperbody is a platform for participation. Hyperbody uses a research driven design approach to create nonstandard & interactive architecture. Non-standard & interactive architecture aims to implement innovative architecture with state-of-the-art materials and information logistics. (Hyperbody, 2015).

In this project, transport data is used as input to create a new routing system over the site, connecting various key nodes. The new routing system creates a footprint wherein functions are configured according to a grasshopper definition, with input from an excel datasheet. External parameters including sun gain, visibility and accessibility trigger the reconfiguration of functions within the building. In the end a grid is introduced, where data is interpolated with a point cloud of all functions, ultimately generating three-dimensional space. Spatial qualities, within the viewport of a smaller scale, constitute the final morphogenesis of the three-dimensional space. Further, local and global climatic associations are established between the building and its context. The use of parametric design tools like grasshopper and its plug-ins Ladybug and GhExcel are used to optimize interim reconfigurations and so the final design. The computational morphogenesis eventually results in a landscape that opens up towards the nodes, creating routes through it and forming the sequence of spaces and interconnections that generate the three-dimensional space architectural qualities.
3.0 Conclusion

This design of a multifunctional transit hub, within the framework of Hyperbody, attempts to translate computational systems and functional requirements into architectural form. The result is a building that anticipates an answer to the necessity of a knowledge economy, covering an urban renovation strategy. By generating a cohesion between the 7@ activities an optimized infrastructure, research and marketing, the design responds to the goals made in the Pla General Metropolità. These coherent elements complement each other as a system within the building itself to create a self-sustaining ecology. Whereas the market forms the assembling element in the infrastructural network, CO2 and kinetic energy are extracted from this network to be recycled in the underground plant factory. In an isolated horticulture climate, under laboratorial supervision, seedlings develop within 30 days to provide the market. The laboratory, facilitates the maintenance of the strict climatic conditions and further research in the reuse of waste products of the infrastructural network. To obtain the edgy combination of a traditional Spanish market, with a high-tech market, ICT, media and design facilities are introduced in the upper layers of the landscape, providing the market from technical goods. Eventually the Provençals Transit Hub serves as catalyst for the further development of the 22@ district, as it constitutes a small version of what the transformed district will be within 20 years according to the Pla General Metropolità.

4.0 Sources