Aspects of dSpace in Contemporary Design

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Computer dependent design space is illustrated with the recent international competition project for Kowloon Arts Center. The spatial condition of design resulted from the deployment of Euclidian geometry and use of the non-rational, complex surfaces. Another aspect of computer dependent space was rooted in the contemporary work situation where architects located on the three different continents collaborated in distributed mode over the internet. The resulting project confirms the creative potential of the above aspects of the digital space in contemporary design.

Keywords: dSpace, Complex Surfaces, VDS, Distributed Collaboration

Site and Geometry

The harbor separating Kowloon from the Hong Kong Central District is important and unique part of the city. Due to its strategic location it has been often compared to the NY Central Park. The government organized international design competition for the conceptual development of this prominent waterfront area. The project was located on the newly reclaimed site of 40 acres at the southern tip of Kowloon Peninsula. It was to provide the visionary and viable ideas that will shape the future development of the waterfront as a unique attraction for both local population and visitors. The proposals were to be aesthetically attractive and broadly feasible in promoting arts and culture.

The West Kowloon Reclamation Area borders on Mong Kok the old and high density urban area. Directly opposite to Central District of Hong Kong it is the prime waterfront site with the commanding and spectacular views of the city skyline. The east side of the project boarders on the Harbor City and Ocean Terminal Parking areas and is within walking distance of Star Ferry and in the close proximity to Tsim Sha Tsui, the vibrant tourist and enter-
tainment district with a wide range of leisure, entertainment and cultural facilities. The initial design studies were based geometry derived from the various aspect of this situation.

Among the first design concepts posted on the shared server was folded wrap of the site area in form of the new man-made landscape generated with FormZ and the offset splines inferred form the profiles of the waterfront and lofted using Maya. Later on the grid taken from the old Mong Kok tenement typology was imposed on the site. The block pattern of the old urban fabric was positioned as the base for the new and non-rational geometry of the quasi-organic forms called by the design team Stones. The two distinct geometries – this of platonic solids and new, non-Euclidian complex derived from nature spatial forms and possible to become important in the early design concept and survived to the vinal version of the project.

Figure 2. The folded landscape and splines from profiles off the waterfront were among early design ideas.

Figure 3. Mong Kok urban fabric deployed initially as base for the non-rational geometry of Stones.
In terms of urban design landmarks were locating the key parts of the project. Its symbolic character was referring to stone like gems common in the classical Chinese landscape painting - casually scattered across the waterfront they were seemingly unintentional and distinct against the background of the typologically familiar city fabric. Organic and asymmetrical in form they became event condensers that housed various cultural activities along the waterfront. Yet another found and deployed geometry was this of linear forms or chopsticks based on the shapes transferred from the transformed harbor quays, like Ocean Terminal. In effect the project was composed out of the merger of the Platonic forms of the Art Mall, the organic Stones and constructed with the aid of digital NURBS modeler. The initially intuitive ideas took its form from the specific situation and where discussed among collaborators and transferred over the internet while the preliminary design and its underlying geometry has evolved in the new design space.

**New Space**

Space comes form Latin *spatium* and it stands often for area or room. It can also mean interval of time. Space can be measured as distance, area or volume. It can be described with a set of axioms of geometric character. The first definition of space considered here deals with duration of time, the second with the design space geometric properties. The concerns for space and time are not new, The cover of early edition of the modernist classic *Space Time and Architecture* depict the highway interchange. But the theoretical connotation of the image on the cover of Giedions book can be seen as different today because of the impact of the so-called *Information Highway*. The information technology is increasingly impacting the nature of the contemporary practice and contributes to the emerging, new space. With the distributed, collaborative modes of working and learning, the Space-Time condition introduced by Einstein and the Cubists remain
central to architecture whose conventions are challenged by the new media today.

Today, the computer constructed design space can consist of both familiar Euclidian geometry and the new, cubic curves based formalisms. In the addition to the deployment of complex surfaces generated with NURBS, the distributed collaborative design is another essential part of contemporary design practice. The formula describing design space conceived under this condition is elusive and is impacted by what we named dSpace.

Computer made dSpace is constructed not only with the time honored Platonic solids, but increasingly with the organic forms resembling blobs or stones and transferred to reality with the help of parametric equations and third degree curves. The web space on other hand remains largely virtual. The early experiments in the distributed design collaboration in the form of VDS were initially significant due to its social dimension. Today distributed and creative professional practice is practical and increasingly deployed outside of academy. Using asynchronous and synchronous techniques in design collaboration.
is common and the issue of connectivity is rapidly becoming an integral part of design. With the growing frequency witnessing designers operating outside the limits of locality.

The growing application of complex surfaces resulting from the proliferation of NURBS modelers is characteristic of the dSPACE. Non Uniform B-splines are mathematical representation of 3-D geometry that can accurately describe any shape from simple 2-D line, circle, arc, or curve to the most complex 3-D organic free form surface or solid. Because of its flexibility and accuracy, NURBS models can be used in any process from illustration and animation to manufacturing. Furthermore, motion models, animation and kinematics are engaged not only in design representation, but also in its generation leading to the questioning the established nature of design discipline. quick prototyping with numerically controlled tools offers the promise of production upstaging the traditional role of orthogonal aspect and abstraction of design. Effectiveness of dSpace is further extended by the growing use of image in production of materiality and representation in design collaboration.

**Conclusion**

Few of the modern architects relied on complex surfaces prior to the computer age. The construction of Luigi Nervi, shells of Felix Candela, Utzon’s Opera House, Philips Pavilion or Ronchamps by Le Corbusier are among the notable, but rare examples of modern architecture in this category. Le Corbusier at the end of his life considered the ruled surface as a particularly interesting convention in describing the complexities of some of his object types and objects de reaction poethique. Yet the majority of the modernist corpus can be still described by orthogonal extrusion and the occasional rational sweep.

Historically the discipline of architecture derived its strength from the explicit engagement of Euclidean geometry. Contemporary ability to visualize and simulate the free forms in early stages of the process permits the collaborators to develop rich design narrative from its conception. Our competition process expends the definition of the new media types used in architectural design and verifies the its effectiveness in discussion and negotiation that occurred during the design cycle. Asynchronous collaboration can be seen as asset in the creative process, since the design universe can be stabilized and structured by the limited feedback in the temporally distributed studio. The diverse individual schedules can be easily accommodated with little consequence to the overall project.

The seesaw between abstraction and simulation, as well as between virtual and real are central condition of contemporary design. Its
process is recorded and the possibility of back-tracking through the design process is a significant source for its understanding. While the IT is now accepted as design facilitator impacting the nature of contemporary practice, the two aspects of modern, computer dependent space are seen by authors as particularly significant.

First, the distinct spatial condition resulted from the deployment of geometries of complex surfaces and use of NURBS modeler. The machine driven formalism of this space was also grounded in the cultural and urban milieu. The clue for deployment of the new geometry can be found in function and situation of the projects. It can be amplified by the new IT tools, like the 3D digitizers that afford form of the reverse engineering, permitting designer to introduce the complex, organic forms to their design universe.

Second and perhaps the most important aspect of computer dependent space was based in the distributed situation within which the project was conceived. The resulting design project attests to the formative importance of the machine and the creative potential of the two aspects of space in its digital deployment. This argument might be verging on theoretical discourse until deployed and illustrated in the exact and precise process. After all, the design collaborators were located in the three separate zones and have met for the first time since the start of the competition at the awards ceremony in Hong Kong.

References
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