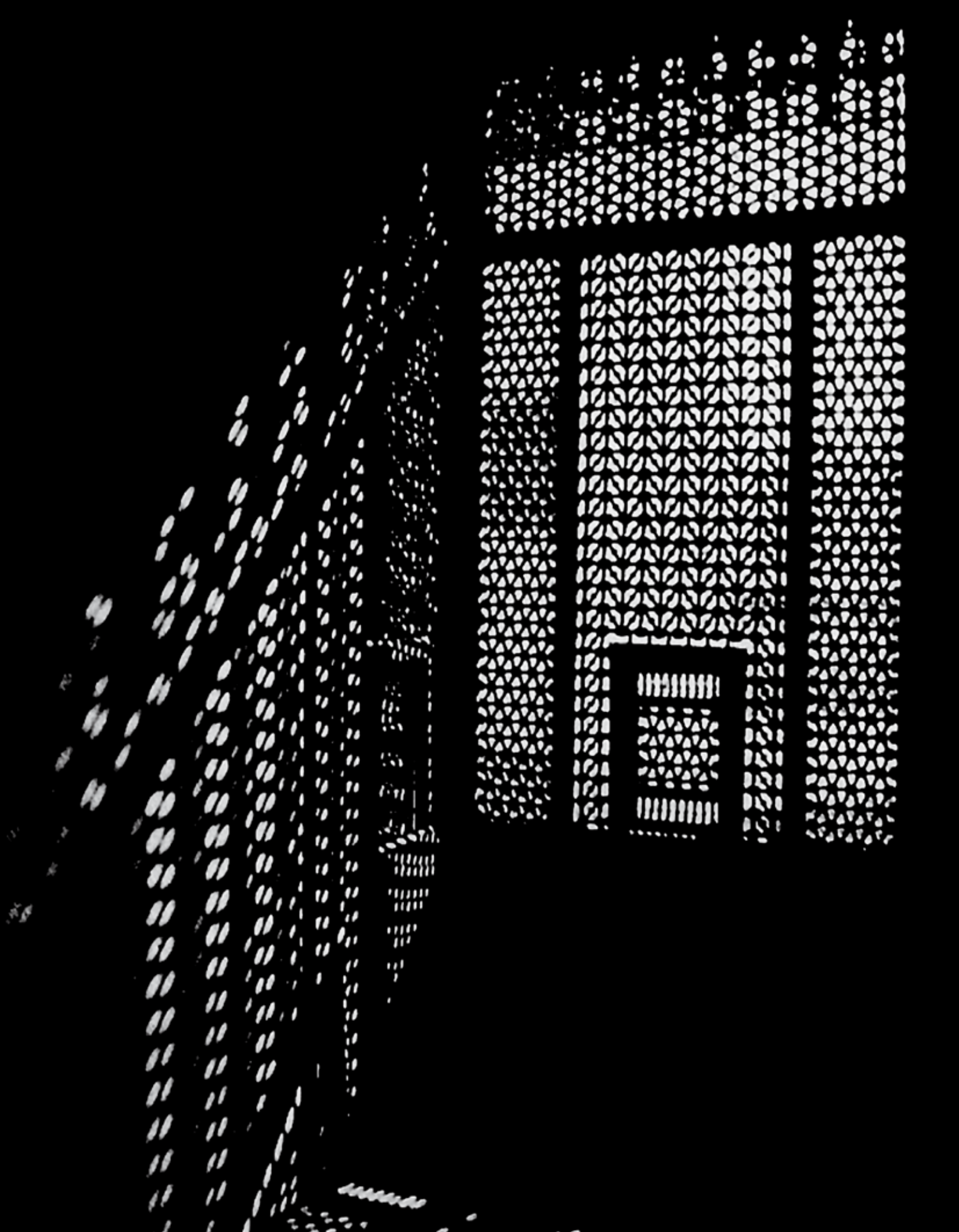

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Generic mosque

Design principles for mosque design

THE CONCEPT OF THE "GENERIC MOSQUE" INVESTIGATES THE REPRESENTATION OF CONTEMPORARY ISLAMIC PRACTICE IN A SECULAR CONTEXT. IT EXPLORES THE IDEA OF A MOSQUE AS A MULTIFUNCTIONAL SPACE, THROUGH SO-CALLED *GENERATIVE DESIGN PRINCIPLES*, A SET OF CONCEPTUAL DESIGN GUIDELINES THAT I DERIVED FROM MY STUDY OF ISLAMIC ARCHITECTURAL HISTORY. THESE DESIGN PRINCIPLES ENABLE DESIGNERS TO DEVELOP A STYLISTIC AND CONCEPTUAL CONTINUITY WITH THE PAST, WHILE ALLOWING THEM TO EXECUTE SPATIAL TRANSFORMATIONS IN RESPONSE TO THE SOCIAL, POLITICAL, ECONOMIC, AND TECHNOLOGICAL CHANGES THAT TAKE PLACE OVER TIME. BY DESIGNING MOSQUES BASED ON THESE PRINCIPLES, I HOPE TO DECONSTRUCT THE PRESENT ISLAMOPHOBIC MOOD IN WESTERN EUROPE AND THE UNITED STATES, AND SHIFT FOCUS FROM THE BIASED AND POLITICIZED REPRESENTATIONS OF ISLAM IN FAVOR OF THE UNIVERSAL BEAUTY OF ARTIFACTS FROM ISLAMIC AESTHETIC CULTURE.

"O men! Behold, we have created you all out of a male and a female, and have made you into nations and tribes, so that you might come to know one another. Verily, the noblest of you in the sight of God is the one who is most deeply conscious of Him. Behold, God is all knowing, all aware."

Qur'an (49:13)

Inspired by this divine call for peaceful coexistence, the concept of the "Generic Mosque" is aimed at encouraging dialogue between Muslims and non-Muslims by providing an interactive infrastructure to accommodate both secular and sacral programs within the same space. I believe that mosque design can contribute to synthesizing learning and interaction among different Islamic and non-Islamic societies. If this relationship is to become a mutual enrichment, mosque design can enable not only their spatial aggregation, but also open up an experimental field for artists and architects to negotiate the way Muslims understand and communicate their presence today.

When dealing with representations of Islam, it is first important to be aware of the tremendous variety of its interpretations, many of which are diametrically opposed to one another. For that reason, Islam cannot be understood as a monolithic structure. At a level of 1.2 billion people, Muslims represent 19-22% of the world population[1]. Islam is currently the second-largest religion in the world after Christianity.

Growing at a faster rate than the total world population, Islam is expected to become the world's largest religion by the year 2025. It is thus crucial to take into account the high diversity of Muslim communities around the world, as they originate from a wide spectrum of different geographical and cultural contexts. Thus, this is also in line with the wide variety of their religious and social practices.

This diversity is reflected in a similar variety of the formal and organizational structures of contemporary mosques. Due to differences in a community's size, its cultural origin and ethnic homogeneity, its status in the dominant culture, financial recourses, functional necessities, and many other parameters, mosque Architecture lacks both formal and functional consistencies. This inconsistency represents a major challenge for architects and architectural historians who seek to re-examine the notion of the "mosque" as an overarching term. The History of Islamic Architecture teaches us that mosques have never been explicitly defined as a particular architectural form. Their formal variety around the world evokes the question of whether the notion of the mosque can be understood as a specific building type at all. In regard to such questions of typology, Rafael Moneo argues that "the work of Architecture is irreducible to any classification"[2]. Moneo's concept of type implies a class of comparable objects with common characteristics.[3] However, the very idea of a type, as proposed by Moneo, has the concept of change embedded in it.[4] Types are not just reproduced identically; they develop, combine, and transform, forming new types and sub-types. They can be thought as *"the frame within which change operates*, a necessary term to the continuing dialectic required by History".[5]

I term this conceptual framework for the formal mutation of types *Generative Design Principles*. Understood as a series of foundational spatial guidelines that establish conceptual architectural grammar, they can be applied to different sites and different Islamic communities in order to create formal variation in design. The extraction of such principles can be carried out in a number of ways that do not necessarily have to originate in a formalist approach. Architectural historian Nader Ardalan, for instance, explored the question of mosque typology as a historical survey of common architectural features. By analyzing the visual language of mosques, he sought to establish a mosque typology by identifying what he calls "generic forms" through their relative occurrence over the last fourteen hundred years[6]. What his analysis renders visible is that the *mihrab* -a niche in the wall, which indicates the direction to Mecca -is the only reoccurring architectural element in all surveyed mosques. Thus for Ardalan, the *mihrab* stands for a generic form that Moneo would interpret as a type.

According to my own definition, however, not the *mihrab*, but the notion of *directionality* would represent one of the generative design principles for mosques. *Mihrab* is thus understood as a physical byproduct of the concept of *directionality*. It is then just one of the many possibilities for the architectural formulation of *directionality*. Furthermore, as there is no universally accepted method for the determination of the prayer direction across Islamic societies, the term *directionality* also allows for many spatial interpretations[7]. It can be understood as an architectural guideline that can be embodied through many different forms. As such, it represents a conceptual framework that has the ability to generate a wide range of formal embodiments. In this context, transformation is anticipated as the inner quality of a spatial system to be tested over time.

Another generative design principle is the principle of *prayer enactment*. According to *hadith* (the sayings of the Prophet Muhammed), the entire world, except for spiritually impure

1. The Muslim Council of Britain; *CIA, The Economist*. 13 de septiembre de 2003.
2. Moneo, R.J. (1978). "On Typology". *Oppositions*. 13, p. 23
3. Ibid.
4. Ibid.
5. For Moneo "the type, rather than being a 'frozen mechanism' to produce architecture, becomes a way of denying the past, as well as a way of looking at the future". Ibid., 27
6. Ardalan, N. (1980). "The Visual Language of Symbolic Form: A Preliminary Study of Mosque Architecture" In: Katz, J.G (ed). *Architecture as Symbol and Self-Identity*. Filadelfia. Aga Khan Arquitecture award. p.18-36
7. Some Islamic communities determine the direction based on the "flat" map system, while others orient themselves according to the shortest distance on the globe.

places, can be understood as a mosque. This means that prayer can be performed anywhere, not only at home or in a dedicated space. For instance, if prayers are to be said in the desert, no architectural framework is needed and the ritual ablution can be performed by using sand instead of water. In this case, the mosque is defined by the worshippers' spatial orientation to Mecca and their performance of the prayer ritual[8]. The principle of *prayer enactment*, in addition to the principle of *directionality*, reveals yet another principle regarding the mosque size: that the minimal size of a mosque is defined by the *volume of prayer*. In other words, the mosque space is minimally characterized by the amount of space a person occupies when performing a prayer directed toward Mecca.

Another example of an outdoor prayer during the Islamic parade in New York City supports this point. Anthropologist Susan Slyomovics analyzed the phenomenon of people praying on the street as a "specifically Muslim reutilization and makeover of the quintessential urban venue"[9]. For the duration of the prayer, *prayer enactment* transforms the street into a mosque. The spatial juxtaposition of two directions, the one of the city grid and the other of the prayer, reveals the transformative nature of a mosque program.[10]

However, this phenomenon is neither solely contemporary nor solely American. Since early Islamic times, the use of mosques was not limited to religious or representational functions. Mosques and mosque complexes also fulfilled various social purposes. They often doubled as hospitals, courtrooms, treasuries, council chambers, sanctuaries, soup kitchens, and even prisons[11]. Historical examples, but also the contemporary reuse of, for instance, major sports facilities to accommodate the Friday prayer or other larger religious gatherings, clarify yet another generative principle of mosques: their *programmatical variability*, meaning that the mosque can switch between religious and secular functions and vice versa.

While multifunctional uses of mosques are increasingly present today, mosques in Western Europe and in the United States not only serve as centers for Muslim communities' religious activities, but they are also institutions that represent, communicate and maintain a particular cultural and ethnic identity. Subsequently, and depending on the community's origin and its immigration pattern, tendencies to reaffirm or redefine cultural identity are dictated by the relationship between immigrants and the dominant culture. The perception which the majority of non-Muslims hold – that a mosque is a sacred space in which only Muslims are allowed to enter – goes against the very notion of a mosque as a space where prayer is performed, but also where other secular activities, such as reading, learning, lecturing, discussing, playing, and even sleeping, can take place. It is exactly this elasticity of spatial use that represents an important aspect of Islamic practice that can be communicated through mosque design.

My reinterpretation of historical elements of mosques focused on questioning how contemporary mosque design can be derived from conceptual, rather than a formal understanding, of mosque typology. The Generative Design Principles introduced in this article, that is, the principle of directionality, prayer enactment, volume of prayer, and the programmatical variability of mosques, seek to bridge the gap between culturally and historically specific forms and functions of mosques and the needs of contemporary Islamic societies living in America and in Europe. By pointing out the variable nature of the mosque, these conceptual spatial guidelines can be employed flexibly in different sites. Moreover, they can provide a methodology that responds to the challenge of negotiating religious functions with

8. The notion of orientation is also elastic in this case. If the exact direction to Mecca is unknown, the prayer can still be performed in any direction. It becomes more a matter of intention of a direction.
9. Slyomovics, S. (1996). "The Muslim Worlds Day Parade and 'Storefront' Mosques of New York City" In: Metcalf, B.D *Making Muslim Space in North America and Europe,* de. Berkeley, Los Angeles, Londres: University of California Press, p.204.
10. Ibid., 205.
11. Irwin, R. (1997). *Islamic Art in Context. Art, Architecture, and the Literary World.* Nueva York: Harry N. Abrams, p.58.

other secular, social and cultural practices with a design of new mosques that are inventive in appearance, yet remain faithful to liturgical necessities. Finally, Generative Design Principles enable a designer to re-symbolize the contemporary Muslim environment in many formal ways. However, the design's success is contingent upon the actual making and using of such an approach, which can only take place if Muslims themselves recognize and accept the basic ideological elasticity of Islam that allows for its own change and progress.

In what follows, I will present my project "Generic Mosque" to show how Generative Design Principles can be utilized in the design of a contemporary mosque.

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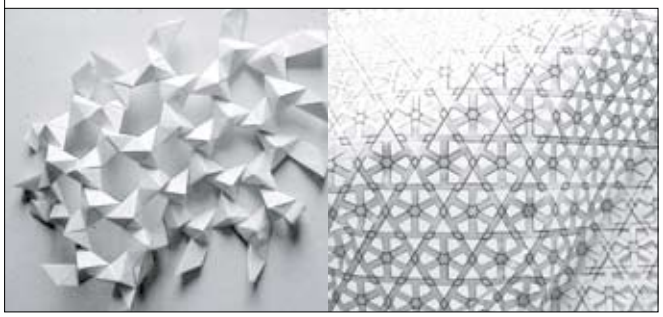

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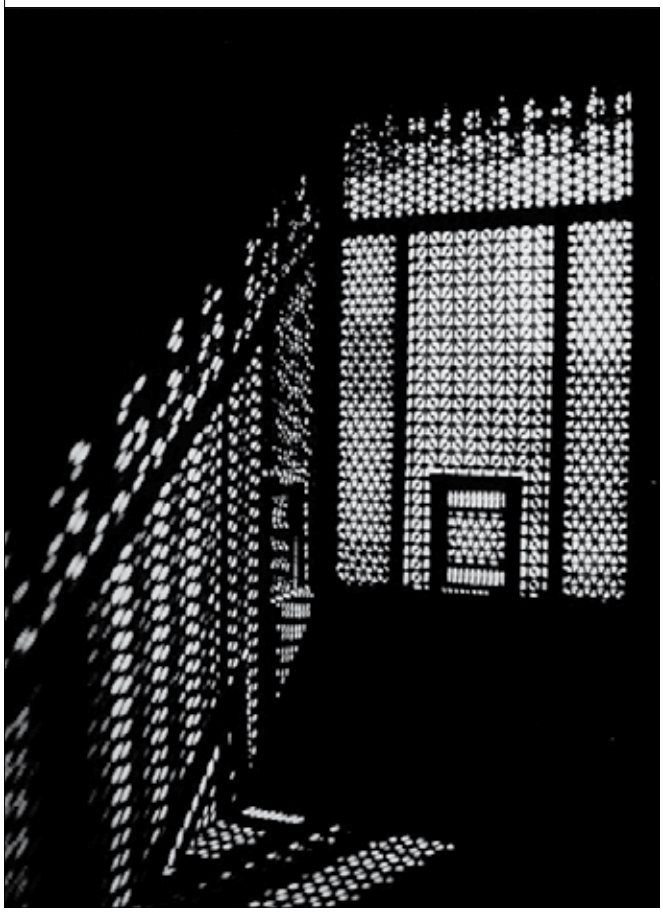

1. My project first utilized Islamic geometrical patterns to extrapolate structural systems.

2. A pattern was first understood as a projection of a more complex three-dimensional geometry.

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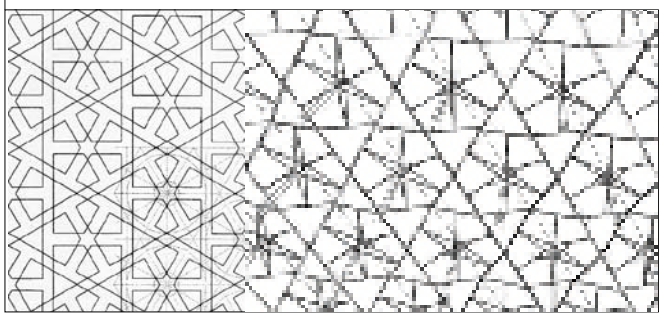

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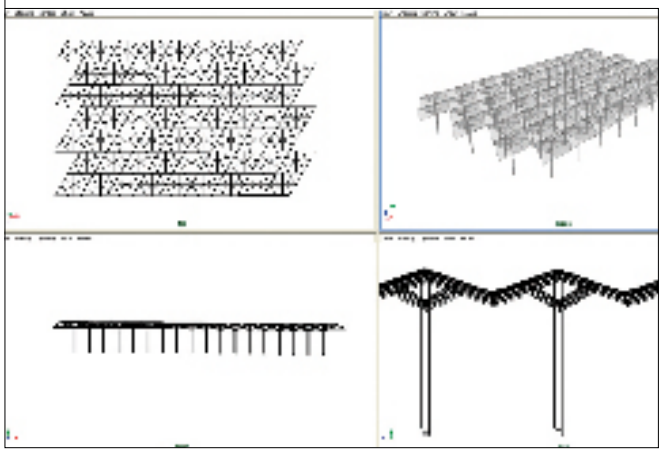

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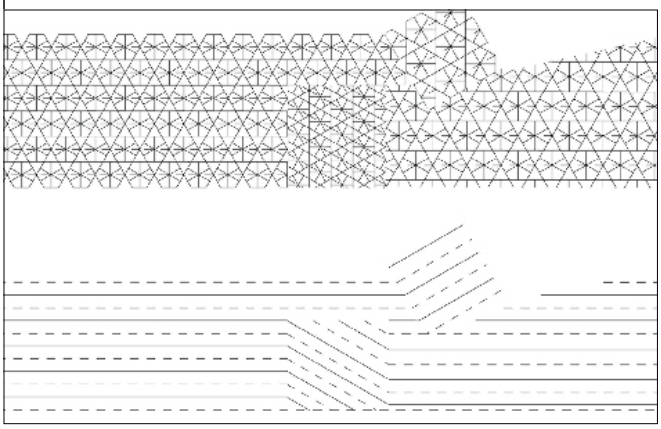

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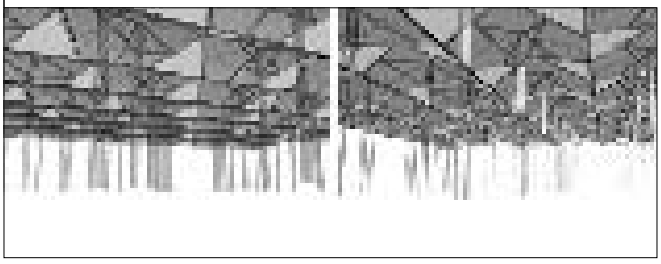

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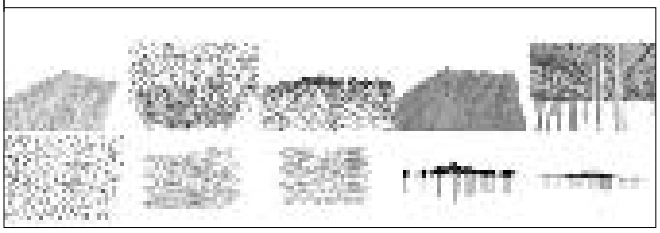

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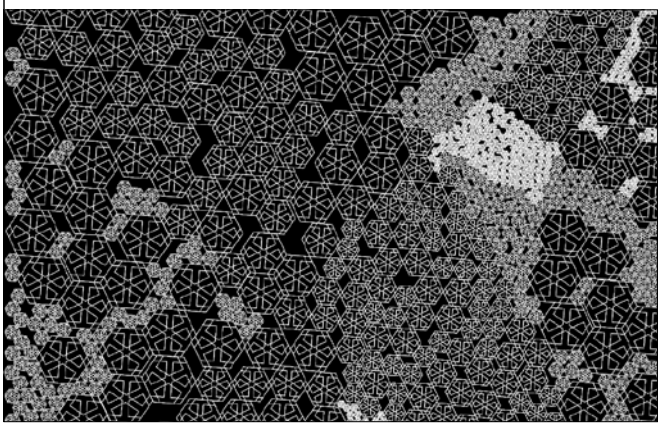

3. Working with an arbitrarily chosen pattern, the first idea was to create a modular system of umbrellas that would permit the variation of mosque scale and shape.

4. By adding or supplementing individual differently-sized umbrella-modules, this mosque would not only become endlessly expandable, but it could also adapt its shape to different site conditions. Symbolically, the system could be understood as a reference to the first mosque of the Prophet and its assumed palm tree shading.

5. Many umbrellas would create a hypostyle mosque, a typology found in many modern structures based on a grid system, like office buildings or shopping malls. While the hypostyle typology creates a non-hierarchical space, its use becomes very flexible. In addition, umbrellas would permit both the indoor and outdoor use of the same structural system.

6. Taking into account the principle of directionality, I manipulated the umbrellas so that their ridges and even rhythms would govern the space.

7. My computer experiments in distorting the structural system and spatial directions became problematic; as I realized that I was distorting the pattern geometry and therefore working against the symbolic meaning they possibly have for some Muslimsprobablement tenia per a alguns musulmans.

8. Finally, the idea of "closed packing", the stacking of individual pattern modules in different sizes, allowed for a manipulation of the pattern by keeping its religious symbolism, yet adding to overall flexibility in size and shape of the building skin.

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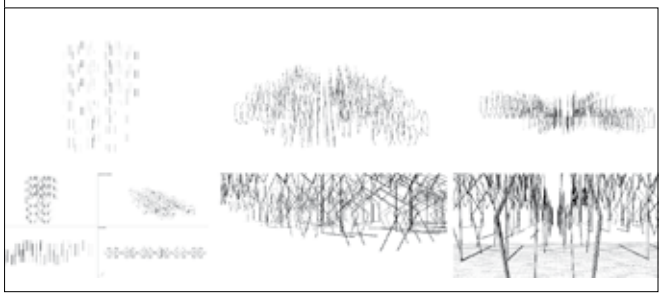

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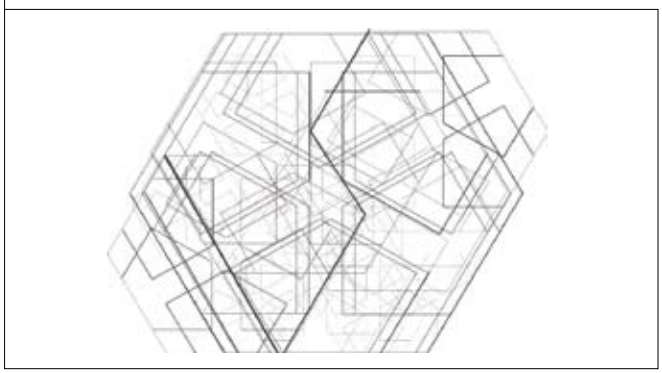

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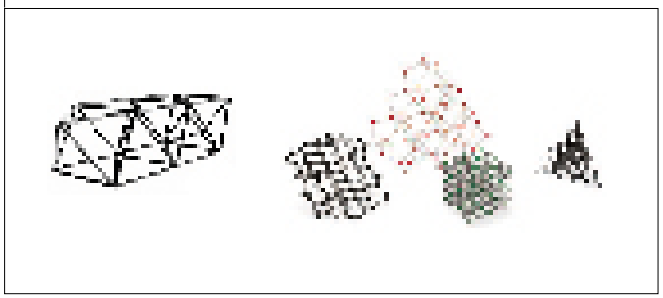

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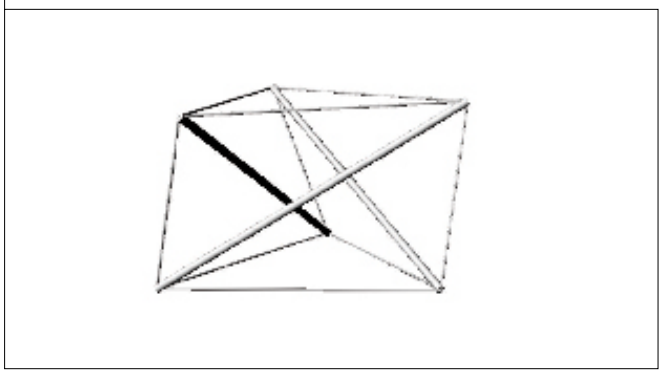

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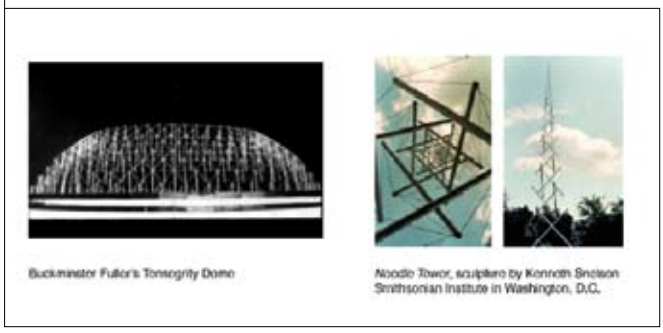

9. The individual layers resolve into a system of columns creating an almost fo rest-like formation that is reminiscent of the Great Mosque of Cordoba. The co nical formation of the columns directed towards Mecca emphasizes the pra yer direction, while providing a visually undisrupted experience during the pra yer ritual. In this way, the entire space takes on the function of the *mihrab*.

10. Looking from the side, the pattern can be sensed in the spatial depth, al though the crystal-like formation entails many different sizes of patterns nes ted in each other.

11. The spiritual understanding of Islamic patterns as a means to describe the world parallels the molecular structure this world contains. Rooted in similar mathematical principles as Islamic patterns, crystal molecules are based on similar three-dimensional patterns.

12. While crystal molecules can be understood as modular systems, these modu les build patterns of modules creating a system of self-similar elements that are nested in each other.

13. Using the structural system of tensegrity, I have followed this idea of microcos mos and macrocosmos in my thoughts about the building skin.

14. Owing to their fragility, tensegrities have not been used very often in contem porary building practices, although many, like Buckminster Fuller or the artist Kenneth Snelson, have been fascinated by their structural possibilities.

15. Understood as a loop of continuous tension and discontinuous pressure, the structure of tensegrity frames a closed universe of circulating load. By combi ning the modules, the individual load behavior becomes transferred to the entire system.

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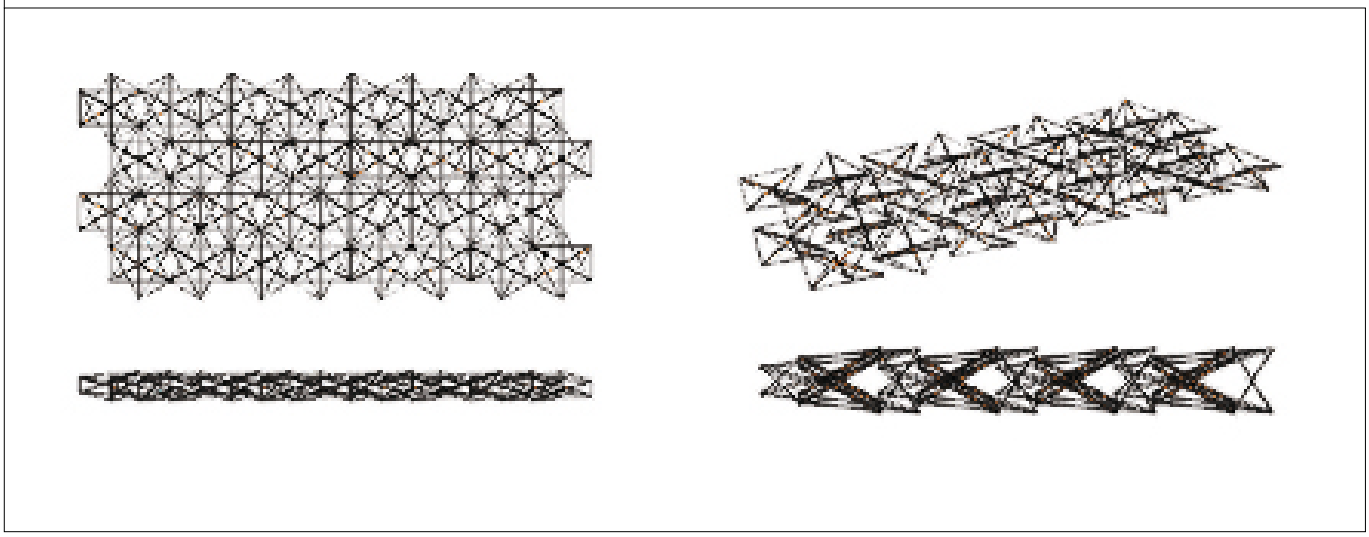

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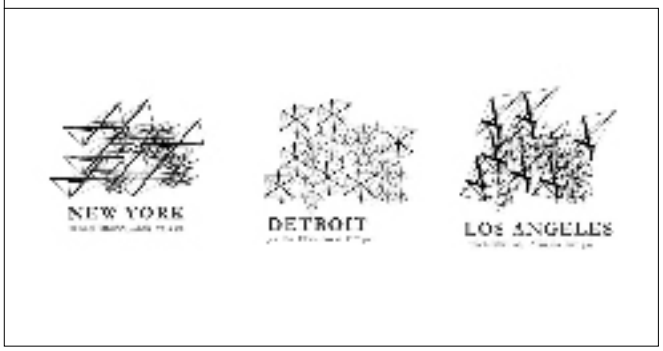

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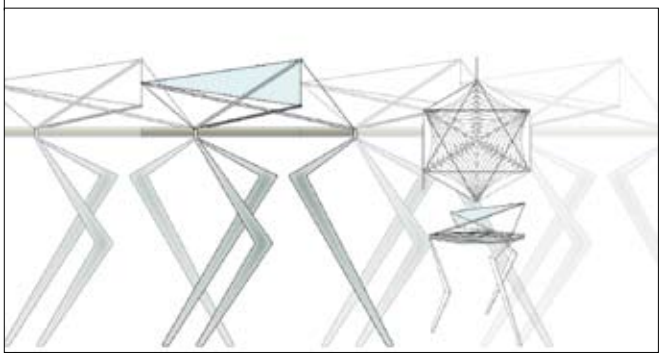

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16. Once implemented at different geographical sites, the changing positions of the sun may affect one or another structure differently, and thus create a variety of shadows on the floor. In this way, structural principles for mosques in different places may have the same roots, but their implications will change depending on the particularities of the location.

17. By putting together the columns and the structural elements of the skin structure, the modular system of the Generic Mosque becomes endlessly expandable.

18. Attaching weather-protective glass, light and shading elements to these modules, adds layers of further patterns to the structure.

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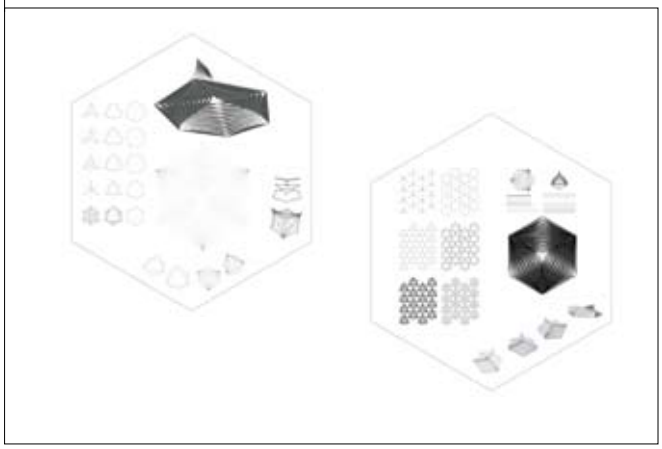

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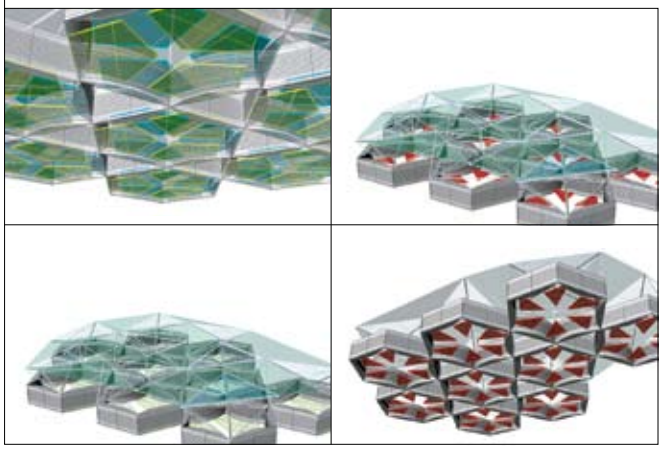

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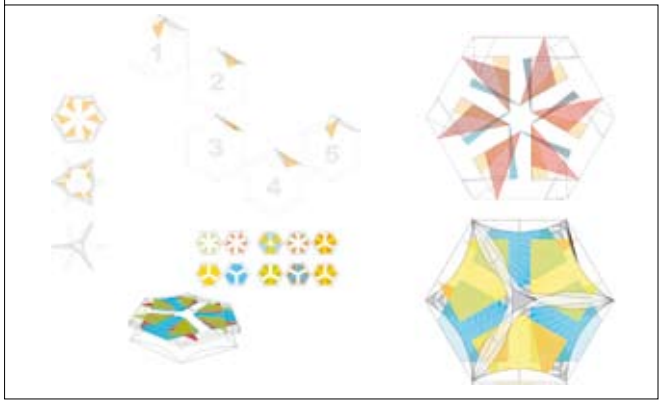

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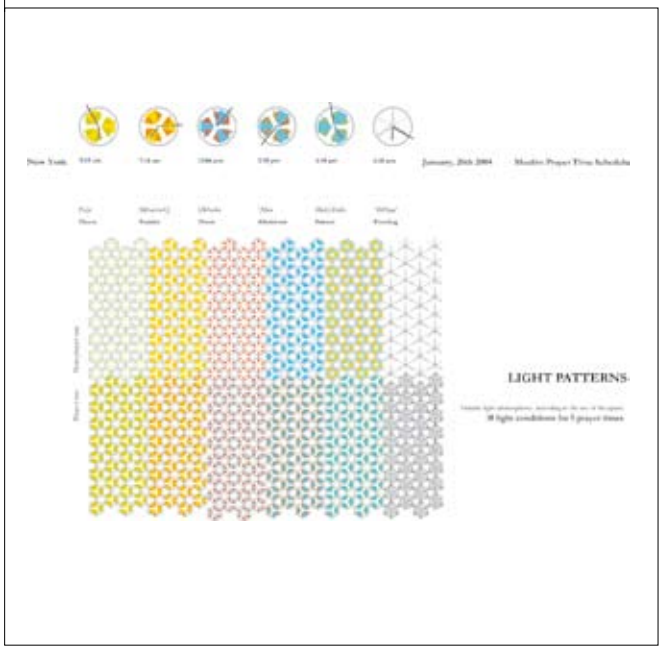

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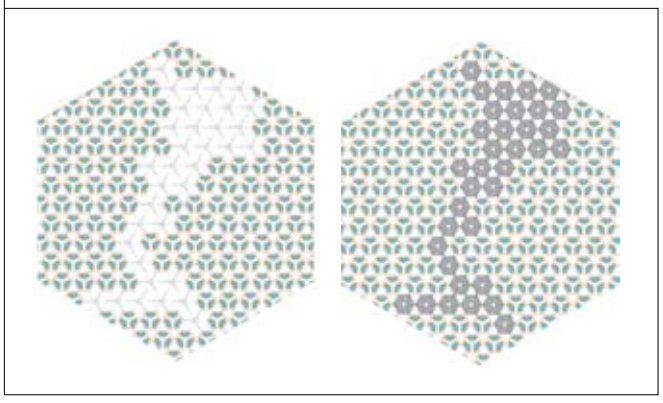

19. The shading system is designed as a set of oculi that are equipped with light sensors. Similar to Jean Nouvel's Arab Institute in Paris, their movement is triggered by the intensity of the sun. In this way, the change and the disconti nuity of the shading pattern is created by the local forces of nature.

20. The shading elements also carry differently-colored light gels.

21. These can be fanned-out from the element's frame. Each colour is assigned a different shape of glass. The variable combination of these light gels then allows for the creation of kaleidoscopic patterns.

22. Reflecting the liturgical use of space, the individual colours can be assigned to different prayer times. In addition, an intensification of colour can be used to signal a particular call for prayer. For instance, if the sunrise prayer time is characterized by yellow, this colour would indicate the particular part of the day, whereas additional red gels would also take on the function of the *mujezin*.

23. The entire roof and façade then becomes a reinterpretation of a minaret. Whi le minarets were originally developed to provide a place from which pra yer calls could be widely hear d, their illuminations are often implemented to signalize diverse religious festivities. With reference to its Arabic meaning as "beacon of light," the different color constellations take on the function of sig nalization. However, its representational connotations as a symbol of power become dissolved in the colorful and warm façade.

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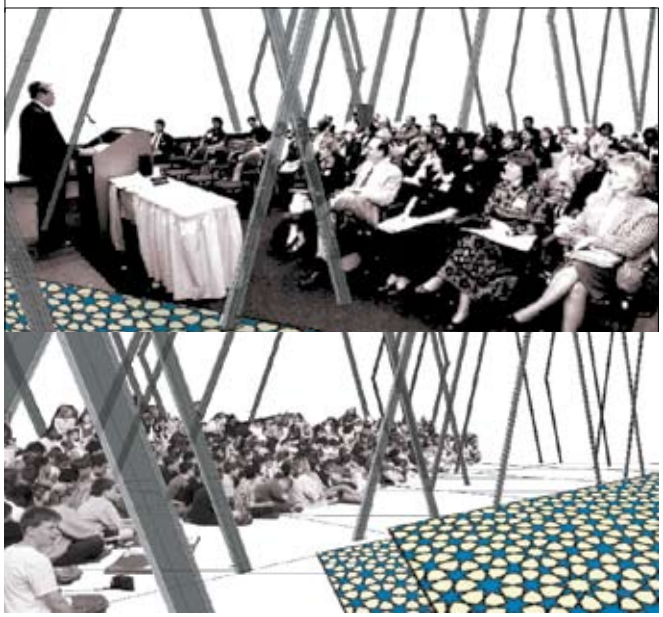

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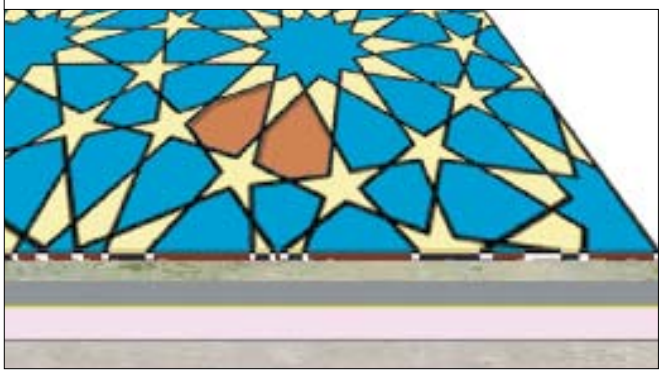

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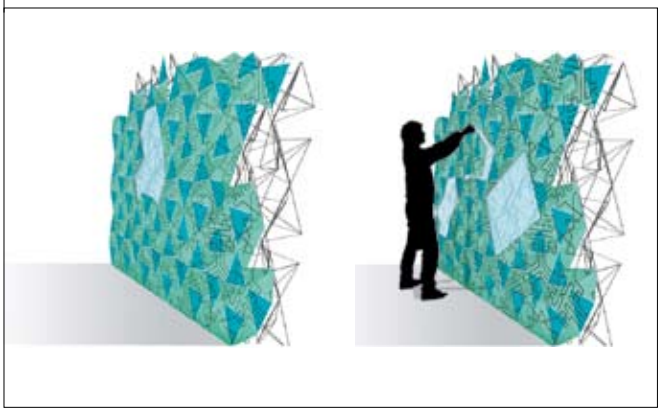

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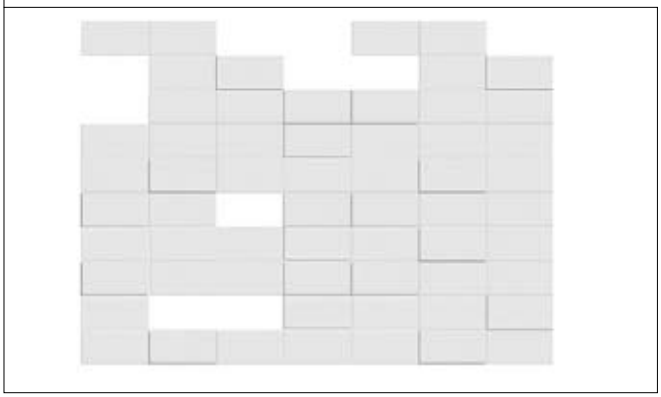

24. The final set of patterns in my design emerges from the very use of space. Taking into account the previously mentioned programmatical variability, the Generic Mosque allows for an accommodation of both secular and sacred functions under a single umbrella. The switching of these functions can be determined through prayer zones marked with light and color, or it can be negotiated by temporal means. In this way, the same space could be used for lectures or seminars at times when the space is not needed for prayer. Howe ver, walking in shoes contradicts the necessary cleanliness of the prayer space.

25. For this, slipper-carpets and prayer rugs would be utilized as architectu ral devices to transform any unclean space into a space suitable for prayer. The floor, designed as a wearable carpet would allow worshippers to perform ablutions in one place and then walk in slippers to the desired prayer spot. By doing this, worshippers would be transferring the slippers from one carpet to another, while changing its colour and pattern.

26. Similarly, worshippers would be actively involved in the transformation of the façade, on which prayer rugs are hung. With each removal of a rug, the wors hipper would create a window in the façade; each subsequent hanging of a rug would leave a trace in its Generic.

27. These traces could also open up different channels of communication, such as voting. Dissimilar thicknesses of the prayer rugs would create dynamic and brick-like effects that reference the notion of the Hazar-baf (patterned relief of a brick façade reminiscent of textile weavings). If a difference in rug thick ness were assigned to male and female worshippers, this would also produce a gendered diagram of prayer participation.

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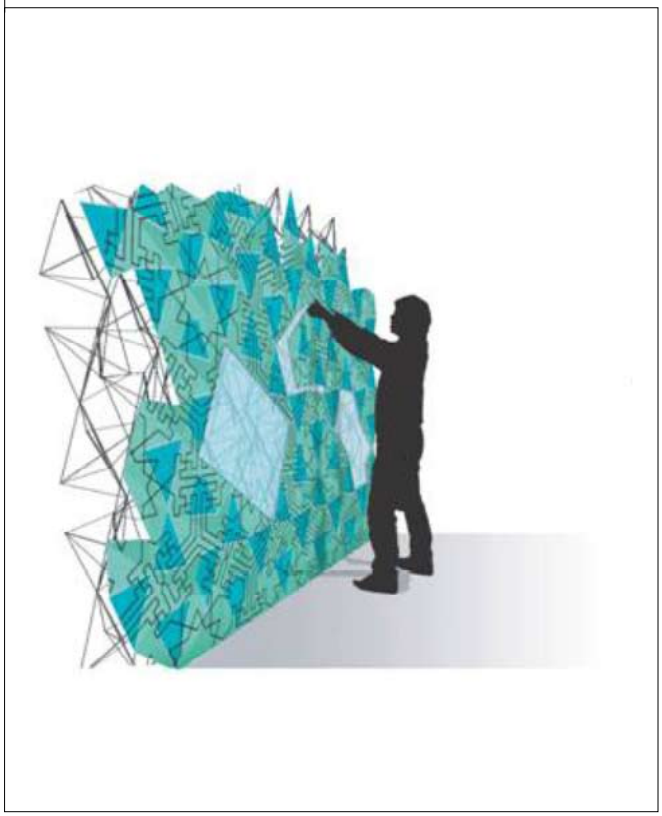

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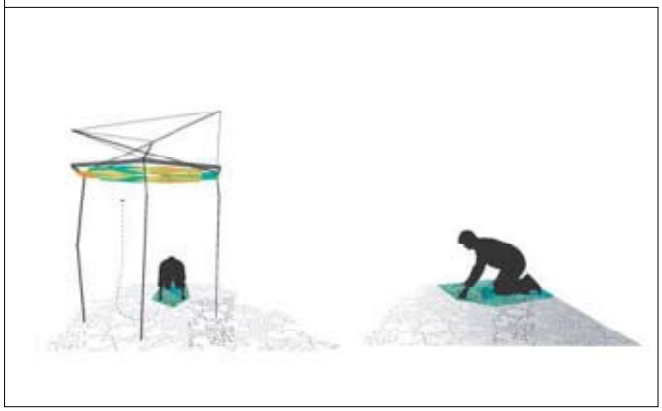

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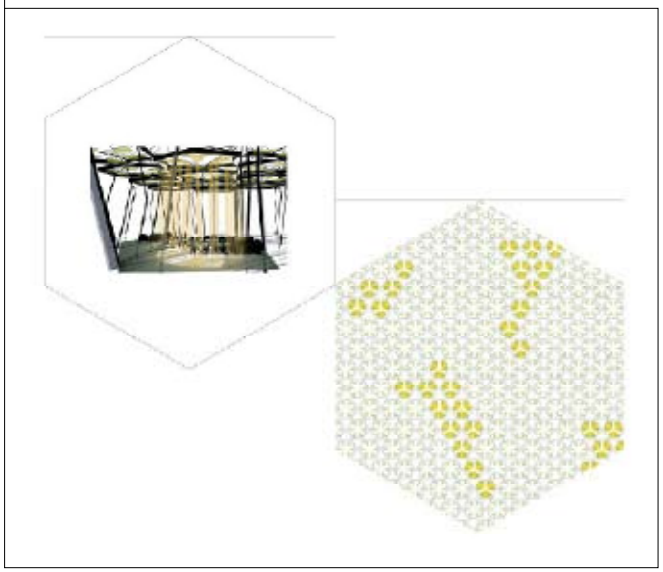

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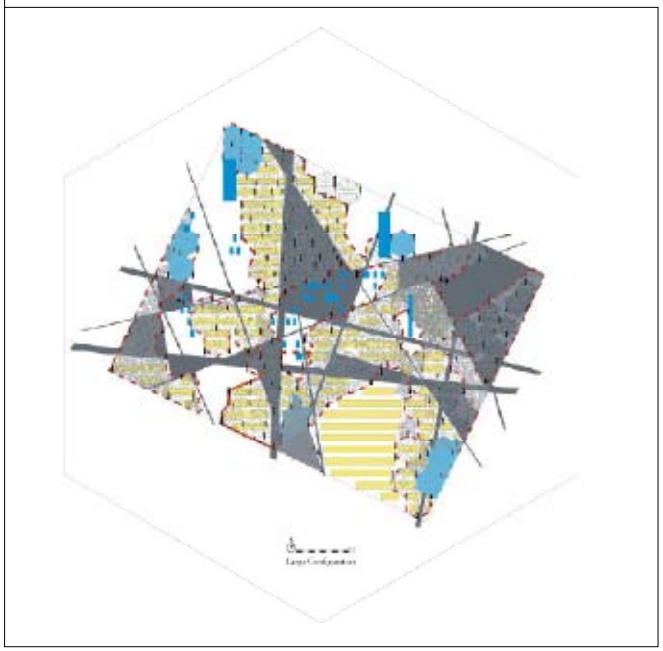


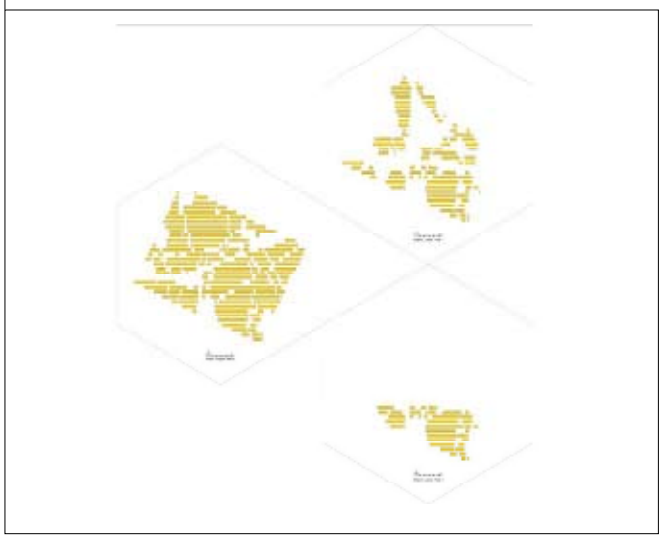
28. The increasing number of worshippers would consequently increase the transparency of the facade. This way, privacy would be determined by the wor shippers themselves, and the act of prayer. The prayer enactment would be come the very means of representation. In addition, the display of the prayer rugs would reflect the programmatic transformation of the mosque.

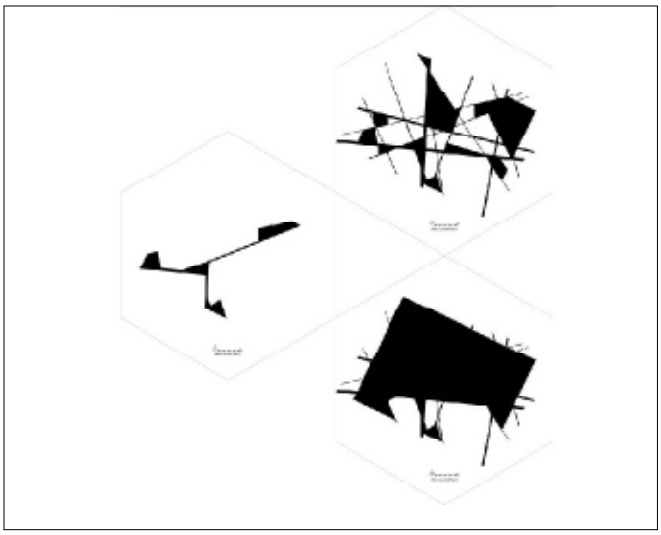
29. This transformative idea is further emphasized through the ritual act of placing the rug on the floor, which would stimulate sensors in the roof and affect its color constellation.

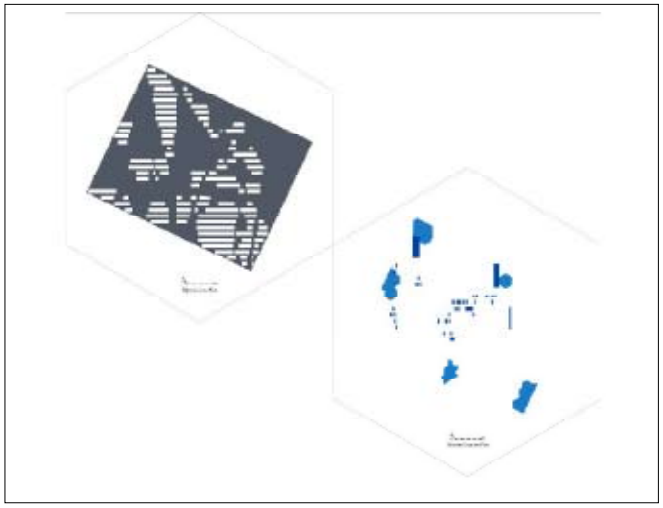
30. The activated roof parts would then spatially reflect the prayer area below, allowing for an elastic territorial determination of space through its use, rather than fixing it with wall boundaries.

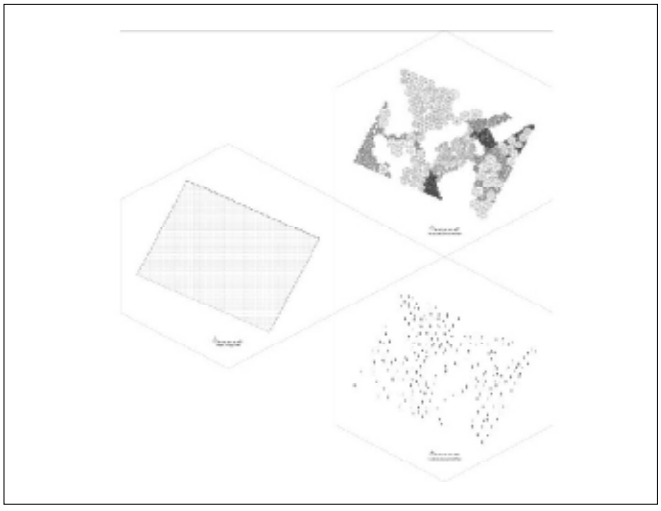
31. An overlapping of all plans creates a multilayered plan that is suggestive of a city plan. With this, the Generic Mosque aims to describe the world, but it also claims to be the world at the same time.

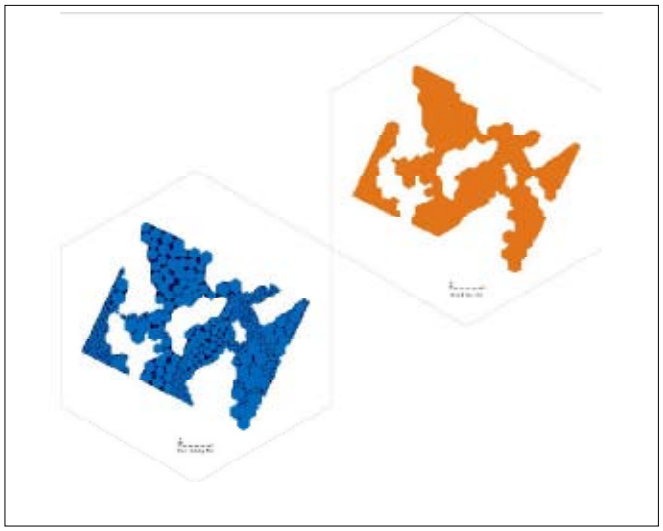
32











32. Finally, employing the previously explained modular elements on an exem plarily site results in a set of plans of Generics such as: columns, structure, glass covered area, variable shoe zones, equivalent prayer rug zones, slip per-carpets, ablution fountains, etc.